Exhibit B
Metro Council Resolution No. 11-4280

Findings of Fact and Conclusions of Law

South/North Corridor Land Use Final Order
Columbia River Crossing Project

INITIAL DRAFT
7/14/11

<u>THIS DRAFT IS SUBJECT TO REVISION AND EXPANSION PRIOR TO FINAL METRO COUNCIL ACTION</u>

1. Introduction

1.1 Nature of the Metro Council's Action

This action adopts a Land Use Final Order (LUFO) for the Columbia River Crossing (CRC) Project, which is an element of the larger South/North Corridor Project. The action is taken pursuant to Oregon Laws 1996 (Special Session), Chapter 12 (referred to herein as "House Bill 3478" or "the Act"), which directs the Metro Council (Council) to issue LUFOs establishing the light rail route, stations, park-and-ride lots and maintenance facilities, and highway improvements for the South/North Project, including their locations (*i.e.* the boundaries within which these facilities and improvements may be located). [1,2]

This LUFO is the fifth in a series of LUFOs the Council has adopted for the South/North Project. The previously adopted LUFOs are as follows:

- On July 23, 1998, the Metro Council adopted Resolution No. 98-2673 (the 1998 LUFO), establishing the initial light rail route, stations, lots and maintenance facilities and the highway improvements, including their locations, for the South/North Project.

- On October 28, 1999, the Metro Council adopted Resolution No. 99-2853A (the 1999 LUFO), amending the 1998 LUFO to reflect revisions for that portion of the South/North Project extending from the Steel Bridge northward to the Portland Metropolitan Exposition Center (Expo Center), primarily along Interstate Avenue. The 1999 LUFO modified the northern light rail alignment; established, relocated or expanded light rail station locations along that alignment; and authorized park-and-ride lots at Portland International Raceway (PIR) and the Expo Center along the light rail route.

- On January 15, 2004, the Metro Council adopted Resolution No. 03-3372 (the 2004 LUFO), further amending the previous South/North LUFO resolutions to (1) establish the light rail route, stations and park-and-ride lots, including their locations, along the Interstate-205 right-of-way from the Gateway Transit Center to Clackamas Regional Center; (2) modify the route along the downtown Portland Transit Mall to extend light rail transit (LRT) to Portland State University (PSU) and establish, adjust or relocate station locations; (3) modify the 1998 LUFO for the segment from Portland to Milwaukie by revising the alignment and adding study areas; (4) remove the 1998 LUFO designations from Milwaukie to Clackamas Regional Center; and (5) complete

[1] Metro's Regional Transportation Plan shows northward extension of light rail to Clark County Washington. However, the Metro Council's jurisdiction is limited to the Oregon portion of the South/North Project.

[2] Section 1(18) of HB 3478 defines the "Project" as "the portion of the South/North MAX Light Rail Project within the Portland metropolitan area urban growth boundary including each segment thereof as set forth in the Phase I South North Corridor Project Locally Preferred Alternative Report, as may be amended from time to time or as may be modified in a Final Statement or the Full Funding Grant Agreement". The Columbia River Crossing Project extends the existing light rail alignment northward from the Expo Center to the Oregon/Washington state line. The Project also provides for highway improvements on and in the vicinity of Interstate 5 (I-5) between Victory Boulevard and the state line.

technical amendments to the 1999 LUFO alignment to reflect the final built configuration at certain stations consistent with the Full Funding Agreement Grant approved by the Federal Transit Administration.

- On July 25, 2008, the Metro Council adopted Resolution No. 08-3964 (the 2008 LUFO), amending the 1998 and 2004 South/North LUFOs as they relate to the segment of the South/North Project extending from Portland State University (PSU) in downtown Portland through SE Portland and downtown Milwaukie to SE Park Avenue in unincorporated Clackamas County. The 2008 LUFO realigned the light rail route between PSU and SE 7th Avenue; established the route from SE Tacoma Street to SE Park Avenue; relocated light rail stations or authorized new stations along the light rail route; and established the park-and-ride lots and highway improvements for the Portland to Milwaukie segment.

This 2011 South/North LUFO Amendment (the 2011 LUFO) amends the 1998 LUFO as it relates to the segment of the South/North Project in north Portland extending northward from the Expo Center and from the Interstate 5/Victory Boulevard Interchange to the Oregon/Washington state line on the Columbia River. This 2011 LUFO realigns the light rail route between the Expo Center and the Oregon/Washington state line westward from its alignment in the 1998 LUFO and it relocates the Hayden Island station west of its previous location. It also provides for the rail route to be accommodated on the lower tier of a new southbound Interstate 5 bridge. This 2011 LUFO also establishes a number of highway improvements for the Columbia River Crossing Segment of the South/North Project, including new northbound and southbound Interstate 5 bridges; widening of Interstate 5 in both directions between approximately N Victory Boulevard the Oregon/Washington state line on the Columbia River; new or modified interchanges at Marine Drive, Hayden Island and Victory Boulevard; a new integrated rail/vehicular/bicycle pedestrian bridge connecting Hayden Island with the Expo Center; and roadway realignments, widenings, modifications and new connections within the project area.

This 2011 LUFO also provides for expansion and improvement of the Ruby Junction Maintenance Facility along NW Eleven Mile Avenue in Gresham to accommodate and maintain additional LRT vehicles associated with the Columbia River Crossing Project.

This 2011 LUFO is also the latest in a long string of land use final orders dating back to 1991 to the approval of the first LUFO for the Westside Corridor Project. That LUFO, and several amendments to that LUFO which followed, expanded the Portland metropolitan region's commitment to a multi-modal transportation network including light rail transit serving populations to the north, south, east and west of the Central City, an improved state highway and local street network, and facilities to encourage walking and bicycle travel. These steps coincided with the Land Conservation and Development Commission's adoption in 1991 of the Transportation Planning Rule, which encourages and supports the availability of a variety of transportation choices for moving people that balance vehicular use with other modes to avoid principal reliance on any one mode. The Westside LUFOs, among other things, approved the extension of light rail initially through Portland, unincorporated Washington County and Beaverton and then later into downtown Hillsboro. They also approved highway

and bicycle improvements associated with the light rail projects, including the widening of US 26 and Oregon 217, new or modified freeway ramps, a new bridge crossing US 26 at Sylvan, a new collector-distributor road system west of the Sylvan Interchange, a new US 26 bridge crossing at Sylvan, the closing of some local accesses to and from US 26, local street realignments, modifications and improvements, and bicycle facility improvements extending from approximately the Oregon Zoo to Oregon 217. The South/North Project continued this commitment to a multi-modal transportation system with a series of light rail and highway improvements extending along the South/North corridor between Clackamas County and the Oregon/Washington state line.[3] The Council anticipates that this 2011 LUFO amendment will not be the final step in that process, as House Bill 3478 envisions that at some future point, light rail transit will extend farther south into Oregon City.

1.2 Relationship of Council's Order to Requirements of the National Environmental Policy Act of 1969

Like the 1998, 1999, 2004 and 2008 LUFOs before it, this 2011 LUFO is adopted solely to implement the provisions in HB 3478 authorizing the Council to make land use decisions on the light rail route, stations, lots and maintenance facilities and the highway improvements for the South/North Project, including their locations. This land use decision is not required by the National Environmental Policy Act of 1969 (NEPA) or other federal law.

1.3 Requirements of House Bill 3478

Section 6(1) of House Bill 3478 requires the Council to "establish the light rail route, stations, lots and maintenance facilities, and the highway improvements for the project or project extension, including their locations." Section 6(1)(a) further provides that the locations for each of these facilities and improvements:

> "*shall be in the form of boundaries within which the light rail route, stations, lots and maintenance facilities, and the highway improvements shall be located. These boundaries shall be sufficient to accommodate adjustments to the specific placements of the light rail route, stations, lots and maintenance facilities, and the highway improvements for which need commonly arises upon the development of more detailed environmental or engineering data following approval of a Full Funding Grant Agreement*."

Section 6(2) of the Act addresses amendments to the 1998 LUFO. It provides:

> *"Any siting of the light rail route, a station, lot or maintenance facility, or a highway improvement outside the locations established in a land use final order, and any new station, lot, maintenance facility or highway improvement, shall require a land use*

[3] The region's rail transit system now has 50 miles of light rail, with a new line south from the Central City to Milwaukie (7.3 miles) in final planning stages. The system includes a 14.7-mile commuter rail serving the southwest part of the region, opened in 2008, and four miles of streetcar with another eight miles under construction. Future light rail projects under consideration include a light rail line along the Barbur Boulevard corridor.

final order amendment or a new land use final order which shall be adopted in accordance with the process provided for in subsection (1) of this section."

Section 7 of HB 3478 requires the Council to apply land use criteria established by the Land Conservation and Development Commission (LCDC) in making decisions in a land use final order on the light rail route, stations, lots and maintenance facilities, and the highway improvements, including their locations, and to prepare and adopt findings of fact and conclusions of law demonstrating compliance with those criteria. *These findings serve to demonstrate compliance with LCDC's criteria for the modifications selected in this LUFO amendment.*

2. Amendments to the Light Rail Route, Stations, Lots and Maintenance Facilities, and Highway Improvements for the Project, Including Their Locations

2.1 Introduction

The Metro Council initially approved a light rail route, stations, park-and-ride lots, maintenance facilities and highway improvements for the Project, including their locations, in the 1998 LUFO. That decision established an alignment from the Clackamas Town Center through downtown Milwaukie to downtown Portland and northward to the Oregon/Washington state line on the Columbia River.

The 1999 LUFO modified the 1998 LUFO by relocating the light rail alignment farther to the west, establishing new light rail station locations, and providing an interim terminus at the Expo Center. The remainder of the Project outside that portion between the Steel Bridge and the Expo Center remained unchanged.

This 2011 LUFO modifies the 1998 LUFO by:

1) Relocating the light rail alignment and Hayden Island station farther to the west;

2) Relocating the light rail alignment leading into Vancouver, Washington onto the lower tier of a new southbound Interstate 5 bridge;

3) Providing significant highway improvements between approximately N. Victory Boulevard and the Oregon/Washington state line on the Columbia River, including but not limited to new northbound and southbound Interstate 5 bridges to accommodate highway, rail, pedestrian and bicycle travel; widening of northbound and southbound Interstate 5 to accommodate three travel lanes and two auxiliary lanes; and interchange and roadway modifications and improvements and new roadway connections within the Project area.

These 2011 findings replace and supersede findings supporting the 1998 LUFO as follows:

- That part in Section 6.4.8 of the 1998 LUFO findings addressing the portion of the North Portland segment between the Expo Center and N Marine Drive;
- In their entirety, Section 6.4.9 of the 1998 LUFO findings addressing the Hayden Island segment.

Further, to the extent these 2011 LUFO findings create inconsistencies with other sections of the 1998 or 1999 LUFO findings [*see, e.g.*, Sections 2.1, 6.1 and 6.3], these 2011 findings control and supersede the earlier findings.

This 2011 LUFO also authorizes use of the Ruby Junction Maintenance Facility in Gresham to serve light rail vehicles associated with the Columbia River Crossing Project.

2.2 Selected Expo Center/Hayden Island Segment Amendments

The Metro Council amends the 1998 LUFO and the 1999 LUFO to select and establish the locations of the light rail route, stations, lots, maintenance facilities and highway improvements identified below. The Council finds that its selected light rail route, stations, lots, maintenance facilities and highway improvements, including their locations, are identical to those for which TriMet requested Council approval in its "Application for South/North Land Use Final Order Amendment (Expo Center/Hayden Island Segments)", which TriMet filed on July 13, 2011 and which the Council incorporates herein by this reference.[4] The light rail route, station, and highway improvements selected by this amendment are described textually and illustrated on the maps contained in the Council's adopted 2011 LUFO.

In the 1998 LUFO there were two segments that, together, provided LRT service between the Expo Center and the Oregon/Washington state line on the Columbia River. These segments were the North Portland segment and the Hayden Island segment. In the 1999 LUFO, the Metro Council renamed the portion of the North Portland segment extending from south of the Columbia Slough near N Columbia Boulevard to the Expo Center the "Expo Center Segment." This 2011 LUFO amendment retains the name "Expo Center Segment" and extends it to N Marine Drive, where the Hayden Island Segment begins. This 2011 LUFO amendment also extends the Expo Center and Hayden Island segments east of Interstate 5 approximately 2,500 feet to include all areas identified for highway improvements. For convenience purposes, these two segments are consolidated and addressed as a single segment (Expo Center/Hayden Island) in these findings.

The Metro Council now deems it appropriate to approve the 2011 LUFO changes for the Expo Center/Hayden Island Segment as follows:

Light Rail Alignment

From the Expo Center station, the light rail alignment proceeds northward under N Marine Drive and onto a new, integrated light rail/vehicular/bicycle/pedestrian bridge crossing over the North Portland Harbor onto Hayden Island west of I-5. The alignment then continues northward, crossing over N Hayden Island Drive onto the lower deck of the new southbound Interstate 5 bridge.

From the state line on the Columbia River, the alignment continues northward into Vancouver, Washington. Because the portion of the Project in the State of Washington is outside the jurisdiction of the State of Oregon, it is not subject to compliance with House Bill 3478 and is not addressed in the LUFO or these LUFO findings.

Light Rail Stations

A single light rail station is located in the Expo Center/Hayden Island Segment.

[4] TriMet's application is attached as Exhibit B to Resolution No. 11-4289.

The **Hayden Island Station** will be elevated and positioned adjacent to I-5, over or near Tomahawk Island Drive. Tomahawk Island Drive will be extended under I-5 to provide a third east/west street connection for Hayden Island. The Hayden Island Plan calls for retail development, a mixed-use station community, and a well-connected street system to be developed adjacent to the station.

Park-and-Ride Lots

There are no new park-and-ride lots in the Expo Center/Hayden Island Segment.

Operations & Maintenance Facilities

There are no operations & maintenance facilities in the Expo Center/Hayden Island Segment. Maintenance will be provided at the existing Ruby Junction Maintenance Facility in Gresham, discussed in Section 2.3 below.

Highway Improvements

The highway improvements in the Expo Center/Hayden Island Segment include the following:

1. New northbound and southbound I-5 Columbia River bridges. The southbound bridge is a two-tier bridge with highway on the upper deck and light rail on the lower deck. The northbound bridge is a two-tier bridge with highway on the upper deck and bicycle and pedestrian facilities on the lower deck. Each bridge will include three travel lanes and two auxiliary lanes.

2. Widening of I-5 in both the northbound and southbound directions from N Victory Boulevard to the Oregon/Washington state line. Northbound, I-5 will widen from three travel lanes at N Victory Boulevard to three travel lanes and two auxiliary lanes on the new northbound I-5 Columbia River bridge. Southbound, I-5 will narrow from three travel lanes and two auxiliary lanes on the new southbound I-5 Columbia River bridge to three lanes south of N Victory Boulevard.

3. A newly designed I-5/Marine Drive interchange, including ramps connecting I-5 with N Marine Drive and NE Martin Luther King Jr. Boulevard.

4. A newly designed I-5/Hayden Island interchange including relocated northbound and southbound exit and entrance ramps. The redesign is intended to further the Hayden Island Plan and implement features that are supportive of transit.

5. A new integrated light rail/vehicular/bicycle/pedestrian bridge west of I-5 connecting Hayden Island with the Expo Center and N Expo Road.

6. Realignment and widening of NE Martin Luther King Jr. Boulevard between the new I-5/Marine Drive interchange and approximately N Hayden Meadows Drive.

7. Realignment and widening of N Marine Drive between N Gantenbein Avenue and N Vancouver Way.

8. Modification, widening and extension of N Vancouver Way between east of N Haney Drive and approximately the light rail alignment west of I-5.

9. Realignment and widening of NE Union Court between N Hayden Meadows Drive and N Vancouver Way.

10. A new northbound connection between NE Martin Luther King Jr. Boulevard and N Vancouver Way and a new southbound connection between NE Martin Luther King Jr. Boulevard and NE Union Court.

11. Realignments, widening and roadway modifications to N Jantzen Avenue, N Jantzen Drive and N Hayden Island Drive.

12. Modification, widening and extension of N Tomahawk Island Drive from east of N Jantzen Drive to the west of I-5.

13. Construction of a new roadway west of I-5 and the light rail alignment between N Jantzen Avenue and N Hayden Island Drive.

14. A new public road extending N Expo Road westward to N Force Avenue.

15. Removal of the existing I-5 Columbia River bridges.

See **Figures 1.1 to 1.3** of the LUFO for the boundaries within which the above described light rail facilities and highway improvements would be located.

2.3 Ruby Junction Maintenance Facility Improvements

The Ruby Junction Maintenance Facility along NW Eleven Mile Avenue in Gresham was first authorized in 1980 as part of the Portland to Gresham light rail project. The facility includes light rail tracks, vehicle storage spaces and maintenance bays, an operation center, and related facilities necessary to maintain light rail vehicles.

As part of the 2008 LUFO amendments for the Portland to Milwaukie Project, the Council approved the modification and expansion of the Ruby Junction Maintenance Facility and adopted location boundaries for it. See **Figure 2.1** of this 2011 LUFO. This LUFO authorizes the use of the facility to serve light rail vehicles associated with the Columbia River Crossing Project. Such use was expressly anticipated in the 2008 LUFO findings. Because use and improvement of the facility in connection with the Columbia River Crossing Project will occur within the location boundaries approved in 2008, the Council finds it is not necessary to amend those boundaries.

3. South/North Project Land Use Final Order Criteria

On May 30, 1996, pursuant to Section 4 of HB 3478, LCDC established the criteria to be used by the Council in making land use decisions establishing or amending the light rail route, stations, lots and maintenance facilities, and the highway improvements for the Project or Project Extension, including their locations. The approved criteria include two procedural, six substantive, and two alignment-specific standards, set out as follows:

3.1 Procedural Criteria

1. Coordinate with and provide an opportunity for Clackamas and Multnomah Counties, the cities of Gladstone, Milwaukie, Oregon City and Portland, the Tri-County Metropolitan Transportation District of Oregon and the Oregon Department of Transportation to submit testimony on the light rail route, light rail stations, park-and-ride lots and vehicle maintenance facilities, and the highway improvements, including their locations.

2. Hold a public hearing to provide an opportunity for the public to submit testimony on the light rail route, light rail stations, park-and-ride lots and vehicle maintenance facilities, and the highway improvements, including their locations.

3.2 Substantive Criteria

3. Identify adverse economic, social and traffic impacts on affected residential, commercial and industrial neighborhoods and mixed use centers. Identify measures to reduce those impacts which could be imposed as conditions of approval during the National Environmental Policy Act (NEPA) process or, if reasonable and necessary, by affected local governments during the local permitting process.

    A. Provide for a light rail route and light rail stations, park-and-ride lots and vehicle maintenance facilities, including their locations, balancing (1) the need for light rail proximity and service to present or planned residential, employment and recreational areas that are capable of enhancing transit ridership; (2) the likely contribution of light rail proximity and service to the development of an efficient and compact urban form; and (3) the need to protect affected neighborhoods from the identified adverse impacts.

    B. Provide for associated highway improvements, including their locations, balancing (1) the need to improve the highway system with (2) the need to protect affected neighborhoods from the identified adverse impacts.

4. Identify adverse noise impacts and identify measures to reduce noise impacts which could be imposed as conditions of approval during the NEPA process or, if reasonable and necessary, by affected local governments during the permitting process.

5. Identify affected landslide areas, areas of severe erosion potential, areas subject to earthquake damage and lands within the 100-year floodplain. Demonstrate that adverse impacts to persons or property can be reduced or mitigated through design or construction techniques which could be imposed during the NEPA process or, if reasonable and necessary, by local governments during the permitting process.

6. Identify adverse impacts on significant fish and wildlife, scenic and open space, riparian, wetland and park and recreational areas, including the Willamette River Greenway, that are protected in acknowledged local comprehensive plans. Where adverse impacts cannot practicably be avoided, encourage the conservation of natural resources by demonstrating that there are measures to reduce or mitigate impacts which could be imposed as conditions of approval during the NEPA process or, if reasonable and necessary, by local governments during the permitting process.

7. Identify adverse impacts associated with stormwater runoff. Demonstrate that there are measures to provide adequate stormwater drainage retention or removal and protect water quality which could be imposed as conditions of approval during the NEPA process or, if reasonable and necessary, by local governments during the permitting process.

8. Identify adverse impacts on significant historic and cultural resources protected in acknowledged comprehensive plans. Where adverse impacts cannot practicably be avoided, identify local, state or federal review processes that are available to address and to reduce adverse impacts to the affected resources.

3.3 Alignment-Specific Criteria

9. Consider a light rail route connecting the Clackamas Town Center area with the City of Milwaukie's Downtown. Consider an extension of the light rail route connecting the City of Oregon City and the City of Gladstone with the City of Milwaukie via the Interstate 205 corridor and/or the McLoughlin Boulevard corridor.

10. Consider a light rail route connecting Portland's Central City with the City of Milwaukie's Downtown via inner southeast Portland neighborhoods and, in the City of Milwaukie, the McLoughlin Boulevard corridor, and further connecting the Central City with north and inner northeast Portland neighborhoods via the Interstate 5/Interstate Avenue corridor.

Compliance with Procedural Criteria 1 and 2 is demonstrated in Section 5 of these findings. Compliance with Substantive Criteria 3 through 8 is demonstrated in Section 6 (long-term impacts) and Section 7 (short term construction impacts) of these findings. The Council finds that Criterion 9 is not relevant to this 2011 LUFO because the South/North Project already connects Clackamas Town Center with downtown Milwaukie and this amendment does not concern light rail extensions from Milwaukie to Gladstone or Oregon City. It finds that compliance with Criterion 9 has been addressed in prior South/North LUFOs, including the 2004 LUFO. Regarding Criterion 10, the Council finds that this 2011 LUFO amendment

further connects the Central City with the Kenton and Hayden Island neighborhoods in north Portland via the existing alignment along the Interstate Avenue corridor.

For all of the reasons set out in these findings, the Council finds and concludes that these 2011 LUFO amendments comply with the applicable LCDC criteria.

4. Implementation of a Land Use Final Order

4.1 Overview of Process for Selecting Mitigation Measures

LCDC Criteria 3 through 8 require the Council to identify (1) specified adverse impacts (*e.g.*, impacts to neighborhoods and natural resources) that would result as a consequence of its decisions, and (2) "measures" to reduce those impacts which potentially could be imposed as conditions of approval during the NEPA process or, if reasonable and necessary, by local governments during the local jurisdiction permitting processes. Consideration of appropriate measures is consistent with local comprehensive plan policies and land use regulations which recognize that development can have adverse impacts on persons and property and which seek to reduce those impacts to the extent reasonable and permitted by law.[5]

The Council's decisions selecting the light rail route, stations, lots and maintenance facilities, and the highway improvements for the Project, including their locations, are not the final steps in the process culminating with completion of construction of the South/North Project. Subsequent to or concurrent with Council actions, Final Environmental Impact Statements (FEIS) are submitted to the Federal Transit Administration (FTA) and the Federal Highway Administration (FHWA). As part of that process, mitigation plans are developed addressing mitigation of adverse impacts associated with the selected rail and highway improvements for the Project. In each case, following federal approval of the FEIS, issuance of a Record of Decision and the signing of a Full Funding Grant Agreement with FTA and FHWA, the Final Design phase will begin. During Final Design, all necessary federal and state permits for project construction are obtained.

Also during Final Design, the siting of light rail and highway improvements is subject to local permitting processes. Section 8(1)(b) of House Bill 3478 directs all affected local governments and agencies to "issue the appropriate development approvals, permits, licenses and certificates necessary for the construction of the Project or project extension consistent with a land use final order." Section 8(1)(b) further allows these affected local governments to attach approval conditions to their development approvals permits, licenses and certificates. However, any such conditions must be "reasonable and necessary" and "may not, by themselves or cumulatively, prevent implementation of a land use final order." Under Section 8(3) of HB 3478, unreasonable or unnecessary conditions would include 1) measures for which there are insufficient funds within the Project budget to pay for those measures; 2) measures that would significantly delay the completion or otherwise prevent the timely implementation of the Project; and 3) measures that would significantly negatively impact Project operations. See also *TriMet v. City of Beaverton*, 132 Or App 253 (1995). A condition prevents implementation of a LUFO if its imposition would require TriMet to finance construction of the condition at the expense of improvements funded under the Full Funding Grant Agreement or to go beyond the available federal funds and local matching funds for the Project. The Council finds that these funds constitute the envelope of available funds for the Project.

[5]Section 1(17) of HB 3478 defines "measures" to include "any mitigation measures, design features, or other amenities or improvements associated with the project or project extension."

In summary, Criteria 3 through 8 require the Council to identify measures which potentially "could be imposed" later in the process as part of an approved mitigation plan under NEPA or through local permitting (if reasonable and necessary). However, the actual determination and imposition of appropriate measures occurs only through these later federal or local processes, not through this Council action. The Council finds this approach to be reasonable and appropriate, particularly given that the LUFO is not based on final design plans. Through final design, many identified adverse impacts may be avoided, and appropriate mitigation can be better determined.

4.2 Effect of Land Use Final Order on Local Comprehensive Plans and Land Use Regulations

Section 8(1)(a) of HB 3478 requires the affected cities and counties and Metro to amend their comprehensive or functional plans, including their public facility and transportation system plans and land use regulations, to the extent necessary to make them consistent with a land use final order. Section 8(2) further provides that a LUFO "shall be fully effective upon adoption."

The legal effects of these provisions are (1) to immediately authorize, as permitted uses, the light rail route, stations, lots and maintenance facilities and the highway improvements, including their locations, as identified and approved in a land use final order, and (2) to require appropriate plan and land use regulation amendments so that local land use requirements are consistent with a land use final order.[6] However, as noted above, the uses approved in a land use final order remain subject to local imposition of reasonable and necessary approval conditions under Section 8(1)(b).

While approval of a LUFO identifies where rail and highway improvements may go and authorizes their development at these locations subject to reasonable and necessary conditions, it does not concurrently prevent other uses allowed by existing zoning. Stated another way, a LUFO is not a right-of-way preservation tool. It does not prevent development of economically feasible uses currently permitted under acknowledged plans and land use regulations. It merely adds to the list of uses permitted on the properties affected by the LUFO without eliminating other uses from that list.

Similarly, a LUFO does not require local zoning amendments to allow more intense scales of development. Instead, it requires amendments only as necessary to authorize the approved Project elements and ancillary facilities or improvements that may be required to ensure the safe and proper functioning and operation of the light rail system or other Project elements, provide Project access, improve traffic flow, circulation or safety in the Project vicinity, or mitigate adverse impacts resulting from the Project.

[6]This may require amendments to authorize the ancillary facilities and improvements for the South/North Project.

In summary, Metro Council adoption of a LUFO has the immediate effect of authorizing, on the affected properties, the light rail and highway facilities and improvements approved in the LUFO. It also identifies the affected locations for future public acquisition for rail or highway purposes. However, LUFO adoption in no way prevents or limits currently allowed uses on these properties during the interim period pending ultimate public acquisition, nor does it mandate the rezoning of areas nearby light rail stations to achieve regional growth management objectives.

5. Compliance with Procedural Criteria (1-2)

5.1 Criterion 1: Agency Coordination

> **"Coordinate with and provide an opportunity for Clackamas and Multnomah Counties, the cities of Gladstone, Milwaukie, Oregon City and Portland, the Tri-County Metropolitan Transportation District of Oregon and the Oregon Department of Transportation to submit testimony on the light rail route, light rail stations, park-and-ride lots and vehicle maintenance facilities, and the highway improvements, including their locations."**

Criterion 1 ensures Metro coordination with the Tri-County Metropolitan Transportation District of Oregon (TriMet), the Oregon Department of Transportation (ODOT), and six cities and counties that are directly affected by the Project or Project Extension. Criterion 1 further requires Metro to provide these jurisdictions and agencies an opportunity to submit testimony on the light rail and highway facilities and improvements for the Project or Project Extension, including their locations.

The light rail route, station, maintenance facility and highway improvement decisions that are the subject of this LUFO amendment fall within the jurisdictional boundaries of the cities of Portland and Gresham. The Metro Council finds that the City of Portland's planning, engineering, and other technical staff, as well as staff from TriMet and ODOT, have been actively involved in the process resulting in these proposed amendments, and that TriMet staff has met with City of Gresham staff with regard to expanding the Ruby Junction Maintenance Facility.

The Council finds that Metro coordination with TriMet, ODOT, Clackamas and Multnomah Counties and the cities of Portland, Milwaukie, Gresham, Oregon City and Gladstone has occurred both through their participation on the LUFO Steering Committee to make recommendations to TriMet on a 2011 LUFO amendment (except for Gladstone) and through invitations to these local governments and agencies to submit testimony to the Metro Council on this amendment. The Council finds that on or about June 13, 2011, TriMet staff mailed Project materials (*Proposed LUFO Steering Committee Recommendation Concerning the 2011 South/North Land Use Final Order*, dated June 23, 2011) describing all aspects of the proposed Project to ODOT and to elected officials of the cities of Portland, Milwaukie, Gresham, and Oregon City, the counties of Multnomah and Clackamas, and Metro, providing them with information regarding the proposed 2011 LUFO amendments for the Columbia River Crossing Project. The Council further finds that the LUFO Steering Committee, which includes representatives from Metro, TriMet, ODOT, Clackamas and Multnomah Counties, and the cities of Portland, Milwaukie, Gresham and Oregon City, reviewed the proposed LUFO amendments and on June 23, 2011, made recommendations to TriMet on those amendments as documented in the 2011 LUFO and as provided for in Section 6(1)(a) of House Bill 3478. Also, the Council finds that ODOT separately submitted its own recommendations to TriMet as required by Section 6(1)(a).

In addition, the Metro Council finds that notice of its August 11, 2011, public hearing to consider this LUFO amendment was mailed directly to each of the above-identified local governments and agencies identified in Criterion 1, including the City of Gladstone, thus providing those local governments and agencies with the opportunity to submit testimony to the Council on the proposed LUFO amendments at that hearing.

In adopting these 2011 LUFO amendments, the Metro Council carefully considered the recommendations of the LUFO Steering Committee and ODOT and the comments of the affected jurisdictions. The Council's decision in this 2011 LUFO amendment proceeding is fully consistent with TriMet's application, which in turn is consistent with the recommendations of the LUFO Steering Committee and ODOT.

For all of these reasons, the Metro Council finds that Criterion 1 is satisfied.

5.2 Criterion 2: Citizen Participation

> **"Hold a public hearing to provide an opportunity for the public to submit testimony on the light rail route, light rail stations, park-and-ride lots and vehicle maintenance facilities, and the highway improvements, including their locations."**

Criterion 2 ensures that the public has an opportunity to submit testimony and be heard in the process leading to the Metro Council's selection of the light rail route, stations, lots and maintenance facilities, and the highway improvements for the Project, including their locations.

On August 11, 2011, consistent with Criterion 2, the Metro Council held a public hearing and accepted public testimony on the proposed amendments to the 1998 LUFO and the 1999 LUFO. This followed public notice, which Metro published in *The Oregonian* on July 14, 2011, which is more than 14 days prior to its hearing. The Metro Council finds that *The Oregonian* is a newspaper of general circulation and that this publication of notice in *The Oregonian* meets and exceeds the requirements for notice set out in HB 3478.

In addition to the published notice, a postcard mailing announcing the hearing was mailed to people on Metro's South/North mailing list for the Columbia River Crossing Project. This list includes owners of property within 250 feet of the light rail and highway alignments and within 250 feet of the Ruby Junction Maintenance Facility boundary.

Also, announcements of the 2011 LUFO public hearing were included on Metro's website.

Further, the Metro Council finds that there has been substantial community participation in the process leading to the selection of the proposed amendments. The Metro Council takes notice of, and incorporates by reference herein, the description of the community participation process leading up to adoption of these 2011 LUFO amendments as set out in Appendix B of the Columbia River Crossing Draft Environmental Impact Statement (May 2008).

In summary, the Metro Council finds that the holding of the public hearing on August 11, 2011, satisfies the requirement of Criterion 2. It further determines and concludes that the notices provided through publication, mailings, recorded announcements and by other means were reasonably calculated to give notice to people who may be substantially affected by the Metro Council's decision on TriMet's application.

6. Compliance with Substantive Criteria (3-8) Long Term Impacts

6.1 Introduction

The Columbia River Crossing portion of the South/North Project will extend South/North LRT from the Expo Center to the Oregon/Washington state line on the Columbia River and then farther northward into Vancouver, Washington. The total length of the LRT extension is 2.9 miles, of which 1.0 mile is within the State of Oregon. Additionally, the Columbia River Crossing portion of the Project will provide two new bridge spans over the Columbia River, enhance pedestrian and bicycle travel in the area, widen and improve I-5, and substantially improve mobility on and the connectivity of the surrounding roadway network between N Victory Boulevard and the Columbia River.

This LUFO amendment affects the Hayden Island segment and a portion of the Expo Center segment of the South/North Project, as identified by the Council in the 1998 and 1999 LUFOs. For ease of analysis, those two segments are addressed as a single, consolidated segment (Expo Center/Hayden Island) in these findings.

6.2 Supporting Documentation

In addition to the findings of fact addressing the selected light rail route, stations, maintenance facilities and highway improvements for the Columbia River Crossing Section of the South/North Project, the Metro Council believes, adopts and incorporates by reference herein the facts set forth in the following documents:

*Columbia River Crossing Draft Environmental Impact Statement (2008)
*Preliminary Columbia River Crossing Technical Reports (including appendices) (2011):
- *Acquisitions Technical Report
- *Air Quality Technical Report
- *Archaeology Technical Report
- *Aviation Technical Report
- *Cumulative Effects Technical Report
- *Economics Technical Report
- *Ecosystems Technical Report
- *Electromagnetic Fields Technical Report
- *Energy Technical Report
- *Environmental Justice Technical Report
- *Geology and Groundwater Technical Report
- *Hazardous Materials Technical Report
- *Historic Built Environmental Technical Report
- *Indirect Effects Technical Report
- *Land Use Technical Report
- *Navigation Technical Report
- *Neighborhoods and Population Technical Report
- *Noise and Vibration Technical Report

*Parks and Recreation Technical Report
*Public Services Technical Report
*TDM and TSM Technical Report
*Traffic Technical Report
*Transit Technical Report
*Utilities Technical Report
*Visual and Aesthetics Technical Report
*Water Quality and Hydrology Technical Report
*Wetlands and Jurisdictional Waters Technical Report
*Stacked Transit/Highway Bridge Memorandum
*Highway, local road and transit roll map
*Biological Assessment for Threatened, Endangered, and Candidate Fish
*Draft Stormwater Management Design

Additionally, the Metro Council takes official notice of the following documents:

*Metro Regional Framework Plan and its components, including the 2040 Growth Concept Map
*Urban Growth Management Functional Plan (codified in Metro code)
*2035 Regional Transportation Plan (RTP) and its components, including the Regional High Capacity Transit System Plan
*Metro Ordinance No. 10-1241B, adopting the 2035 RTP
*City of Portland Comprehensive Plan
*City of Portland Transportation System Plan
*1998 South/North Land Use Final Order Findings
*1999 South/North Land Use Final Order Findings of Fact and Conclusions of Law
*Metro Resolution No. 11-4264, including attached exhibits

6.3 Expo Center/Hayden Island Segment: Findings and Mitigation Measures[7]

As noted in Section 2.2 of these findings, the Expo Center/Hayden Island Segment of the South/North Project includes the following facilities in Oregon:

- For light rail, the Project extends the existing MAX light rail facilities from the Expo Center Station in north Portland northward across Hayden Island to the Oregon/Washington state line on the Columbia River. The light rail transit alignment is located to the west of the alignment approved in the 1998 South/North LUFO and includes one LRT station on Hayden Island.

[7] The 1998 South/North LUFO was supported by "general findings" addressing impacts and measures applicable to all segments of the South/North Project (Section 6.3), and by "segment-specific findings" addressing additional impacts specific to a particular segment of the Project (Section 6.4). The 1999, 2004 and 2008 LUFO amendments incorporated the "general findings" by reference while making new segment-specific findings. Because this 2011 LUFO amendment consolidates the Expo Center and Hayden Island segments into a single segment for purposes of impact analysis, the "general findings" are not incorporated by reference but rather restated herein on a criterion-by-criterion basis. In restating these general findings, the Council relies on the factual base that was established as part of the 1998 LUFO decision.

- For the highway improvements, the Project begins just south of N Victory Boulevard and extends northward to the Oregon/Washington state line on the Columbia River. The multi-modal Project includes a new bridge crossing over the Columbia River (including the LRT extension noted above), and related highway, interchange and bicycle and pedestrian improvements.

See **Figures 1.1 to 1.3** of the LUFO for the boundaries within which these light rail facilities and highway improvements will be located.

6.3.1 Criterion 3: Neighborhood Impacts

"Identify adverse economic, social and traffic impacts on affected residential, commercial and industrial neighborhoods and mixed use centers. Identify measures to reduce those impacts which could be imposed as conditions of approval during the National Environmental Policy Act (NEPA) process or, if reasonable and necessary, by affected local governments during the local permitting process."

"A. Provide for a light rail route and light rail stations, park-and-ride lots and vehicle maintenance facilities, including their locations, balancing (1) the need for light rail proximity and service to present or planned residential, employment and recreational areas that are capable of enhancing transit ridership; (2) the likely contribution of light rail proximity and service to the development of an efficient and compact urban form; and (3) the need to protect affected neighborhoods from the identified adverse impacts."

"B. Provide for associated highway improvements, including their locations, balancing (1) the need to improve the highway system with (2) the need to protect affected neighborhoods from the identified adverse impacts."

Criterion 3 requires the Council to provide for a light rail route, stations, lots, maintenance facilities and associated highway improvements, "balancing" the need to protect affected neighborhoods from identified adverse impacts with the positive benefits provided by light rail proximity and service (including the development of an efficient and compact urban form) and by an improved highway system.

The Council finds that the Columbia River Crossing Project amending the 1998 LUFO includes both light rail facilities and associated highway improvements. These improvements were identified and analyzed as Alternative 3 in the DEIS issued in 2008. After a public hearing on the DEIS on May 29, 2008 and extensive public review, a Locally Preferred Alternative (LPA) was selected. The LPA was endorsed by TriMet and ODOT and is being advanced into the Final Environmental Impact Statement as the Preferred Alternative. The Preferred Alternative includes the light rail improvements necessary and appropriate to extend

the South/North Light Rail Project into the State of Washington and the associated highway improvements, as presented in this application.

The Council finds that the Project, as set out in the LPA and the LUFO application, will be a significant transportation improvement project in which light rail, highway, bicycle and pedestrian improvements are all associated as part of an integrated, multi-modal project. The Council finds that the affected local governments and agencies involved in this Project have expressed strong interest that the Project be a joint light rail and highway project. It finds that the associated highway improvements directly and indirectly serve the light rail improvements by accommodating the alignment (e.g., new I-5 bridges, new arterial bridge over the North Portland Harbor) or providing regional and local access to the Expo Center and Hayden Island light rail stations (e.g., I-5 interchange improvements, access and circulation improvements and roadway modifications on Hayden Island and in the vicinity of the Marine Drive interchange). The Council further finds that some of the highway improvements are needed for engineering purposes to accommodate the new bridge containing the light rail alignment and the modifications to the I-5 interchanges and their approaches. And the Council finds that the light rail and highway improvements are linked together as well in federal and state proposals for funding the Project. See Metro Resolution No. 11-4264 and Exhibit A attached thereto, incorporated herein by this reference.

Description of Affected Neighborhoods in the Expo Center/Hayden Island Segment

The consolidated Expo Center/ Hayden Island segment extends north from N Marine Drive across the North Portland Harbor and Hayden Island to the Oregon/Washington state line in the Columbia River. The segment includes portions of the East Columbia, Kenton, Bridgeton and Hayden Island neighborhoods. These neighborhoods are identified and described in the Neighborhoods and Population Technical Report, incorporated herein by reference. Major public land uses in this segment include the Portland International Raceway, the Expo Center, and Delta Park.

The *East Columbia Neighborhood* is located directly east of I-5 and extends from the Columbia Slough north to Marine Drive. East Columbia contains a variety of land uses including large recreational and entertainment uses on the western and eastern boundaries of the neighborhood. One such use is East Delta Park, which is 86 acres in size. It features the Delta Sports Complex with five lighted softball fields and a synthetic soccer field. The complex also hosts additional softball fields, seven grass soccer fields, six sand volleyball courts, a playground, picnic tables, an off-leash dog area, and nature trails. The neighborhood also includes wetlands, trucking companies, and small industrial businesses. Other amenities within the East Columbia Neighborhood are Portland Meadows Race Track and Columbia Edgewater Golf Course. Between these large tracts of land are several manufactured home parks and large tracts of industrial land.

The East Columbia Neighborhood contained an estimated 2000 US Census population of 344. The percentage of African American residents is approximately twice that of the county or city, while the percentage of Hispanic or Latino residences is substantially smaller than that of the county or city. The percentage of population 65 years of age or older is one-third of the city percentage and slightly more than one-third of the county percentage.

The *Kenton Neighborhood* is located west of I-5 and extends from Lombard Avenue to North Portland Harbor. Kenton contains a wide range of uses, including residential, commercial, industrial, and recreational. Single-family residential development is concentrated south of Columbia Boulevard, with commercial and industrial uses located to its north. Multi-family residential dwellings are scattered throughout the neighborhood, but a majority are found among densely packed commercial structures along Interstate and Lombard Avenues.
The northern portion of Kenton contains multiple community resources including Portland International Raceway, Heron Lakes Golf Course, Multnomah County Fairgrounds, and the Expo Center. The large Paul Bunyan statue at the intersection of N Interstate and N Argyle Avenues, the Kenton Neighborhood Rose Garden, and the Historic Kenton Firehouse are also important cultural resources that provide identity to the community. West Delta Park and Vanport Wetlands serve as natural resources, as does Kenton Park on Brandon Avenue. There are many historic resources including the Kenton commercial historic shopping district on Denver Avenue, the historic David Cole House on N McClellan, and the historic Kenton Firehouse on Brandon Avenue.

The Kenton Neighborhood contained an estimated 2000 US Census population of 7,086. The percentage of African American residents in Kenton is more than twice that of the county or city, while the percentage of Hispanic or Latino residents is slightly higher than that of the county or city. The percentage of population 65 years of age or older is within one percent of the city percentage and county percentage.

The *Bridgeton Neighborhood* is located east of I-5 on North Portland Harbor. It is an early Portland neighborhood with cottages built between 1915 and 1930 along the Columbia River. Residential uses are concentrated at the eastern end of the neighborhood, both on land in rowhouses and detached single-family dwellings, and on the river in floating homes. Industrial uses can be found directly adjacent to I-5 around the Marine Drive interchange. There is a small commercial node at Marine Drive and I-5. Columbia High School and its adjacent playfield act as important community resources, as do the neighboring sloughs and the Columbia River, which provide recreational uses.

The Bridgeton Neighborhood contained an estimated 2000 US Census population of only 39 within the area of potential impact from the COLUMBIA RIVER CROSSING Project. The percentage of Hispanic or Latino population is lower than the county and city, while the percentage of African Americans is double that found in Multnomah County and almost double the percentage found in Portland. The percentage of population 65 years of age or older is one-third of the city percentage and slightly more than one-third of the county percentage.

While a range of uses is located in the *Hayden Island Neighborhood*, the primary use is commercial. Jantzen Beach Center, a large commercial mall, and other retail uses are located to the west of I-5. Hotels and restaurants are also located on the island. Residential uses are located in the northwestern and eastern portions of the island. The residences in the northwestern area are manufactured homes. In the eastern portion of the island the residences

are both on the land and in the river; floating homes are located on the south side of the island and along North Portland Harbor. Small marinas are located around the island.

The Hayden Island Neighborhood contained an estimated 2000 US Census population of 2,086. The percentage of minority population and proportion of households below the poverty level is lower in the neighborhood than for the county and the region. The percentage of population over 65 years of age is considerably higher than averages for the county and the region

The LRT alignment will generally parallel the west side of I-5 through this segment, with a station located at the east end of the Jantzen Beach Center.

Identify adverse economic, social and traffic impacts on affected neighborhoods. Identify measures to reduce those impacts.

Economic, social and traffic impacts specific to the Expo Center/Hayden Island Segment are addressed in the following section. Economic, social and traffic impacts are also described, along with corresponding mitigation measures, in the Acquisitions Technical Report, Aviation Technical Report, Economics Technical Report, Environmental Justice Technical Report, Land Use Technical Report, Navigation Technical Report, Neighborhoods and Population Technical Report, Traffic Technical Report, Transit Technical Report, and Visual and Aesthetics Technical Report.

For the purpose of these findings, long-term adverse impacts generally are grouped under one of three headings: economic, social or traffic impacts. The Council recognizes, however, that impacts often can fall under more than one heading. For example, impacts on freight movement may be relevant as both economic and traffic impacts. Displacements have both economic and social implications. Parking can be categorized as an economic, social and traffic concern. The Council intends these findings to be interpreted broadly to allow overlap among these different categories.

Although the following list is not exclusive, the Council finds that the economic, social and traffic impacts associated with the Columbia River Crossing Project fall primarily within the following categories:

Economic Impacts

- Business displacements
- Loss of parking/access
- Tax base
- Freight movement (train, truck, water and air)

Social Impacts

- Residential displacements
- Access to community facilities
- Barriers to neighborhood interaction
- Safety and security

- Visual/aesthetic

Traffic Impacts
- Transit
- Systemwide and local traffic impacts

As noted, Criterion 3 directs the Council to balance these impacts with the need for light rail and highway improvements. Before identifying the adverse economic, social and traffic impacts on the affected neighborhoods, the Council finds it useful to briefly summarize the need for the light rail and highway improvements that comprise the Columbia River Crossing Project.

Overview of Need for Light Rail and Highway Improvements in the Expo Center/Hayden Island Segment

The Council finds that the Columbia River Crossing Project seeks to address problems relating to growing travel demand and congestion; impaired freight movement; limited public transportation operation, connectivity and reliability; safety and vulnerability to incidents; substandard bicycle and pedestrian facilities; and seismic vulnerability.

1. **Growing travel demand and congestion**: Heavy congestion on I-5 in the project area is the result of growth in regional population, employment, and interstate commerce. The existing I-5 crossing provides three lanes each for northbound and southbound travel, which can accommodate approximately 5,500 vehicles per hour in each direction. However, there are more people who want to use the crossing during peak periods than the bridges can accommodate, which results in stop-and-go traffic in the mornings and afternoons. Cars entering I-5 have little room to accelerate and merge with highway traffic (short merging lanes), and cars on I-5 have no room to pull off the highway (narrow or no shoulders) when an accident occurs or when vehicles break down. These conditions make congestion worse and decrease safety. Traffic can also become congested when the bridges' lift spans are raised to allow large river vessels to navigate underneath the bridges.

2. **Impaired freight movement**: Congestion on I-5 reduces freight mobility between regional markets in Portland and Vancouver, as well as national and international (Mexico or Canada) destinations along the I-5 corridor. Freight trucks most often travel in the middle of the day to avoid congestion, but can be delayed by bridge lifts. As hours of congestion continue to increase over time, travel times for freight trucks will continue to increase—even when traveling during the off-peak hours. This increases delivery times and raises shipping costs. It also negatively affects this region's economy. Truck-hauled freight in the Portland-Vancouver metropolitan region is expected to grow more rapidly than other forms of freight movement (such as marine-hauled freight).

3. **Limited public transportation operation, connectivity, and reliability**: Congestion on I-5 reduces bus travel speeds and reliability. Local bus services currently travel between downtown Vancouver and downtown Portland. Express bus routes serve commuters by providing service directly from Clark County park-and-rides to downtown Portland. Both

of these services travel over the I-5 bridges. Bus travel times from downtown Vancouver to Hayden Island increased 50 percent between 1998 and 2005. On average, local bus travel times are from 10 to 60 percent longer during peak periods than during off-peak periods.

4. **Safety and vulnerability to incidents**: Over 300 vehicle crashes are reported annually on I-5 in the project area, making this one of the most accident-intensive sections of I-5. This high accident rate is a result of multiple highway design features that do not meet current standards, including:

    - Close interchange spacing – Within the Columbia River Crossing Project area, I-5 has six interchanges spaced approximately one-half mile apart. The recommended minimum distance between interchanges is one mile so that cars entering and exiting the highway have enough distance to fully merge with traffic or diverge to the off-ramp before the next interchange.

    - Short on- and off-ramps – Several on-ramps are not long enough for vehicles to reach highway speed before merging with highway traffic. Off-ramps are too short for safely slowing down, and during heavy traffic, these short ramps may cause exiting vehicles to back up onto I-5. This generates traffic congestion and can cause accidents because maneuvering is difficult, especially for large trucks.

    - Vertical grade changes – A "hump" in the I-5 bridges that accommodates the Columbia River shipping channel blocks the view of roadway conditions ahead. This blocked view reduces speeds and creates potential hazards to motorists.

    - Narrow lanes and shoulders – Several portions of I-5 in the project area have narrow inside and outside shoulders, while the I-5 bridges essentially have no shoulders, with less than one foot between the outside lanes and the bridges' side barriers. The northbound I-5 bridge also has lanes one foot narrower than the minimum standard for a highway, and no shoulders. These conditions place vehicles very close to physical barriers and other vehicles, causing motorists to slow down, and do not provide space for disabled or emergency vehicles.

    - Hazardous river navigation – The U.S. Coast Guard (USCG) allows ODOT to not raise the I-5 bridges' lift spans during peak traffic periods because of the substantial impacts this would have on bridge traffic. This requires boats heading downstream (west) to navigate using the fixed "barge channel" near the middle of the river, and then quickly turn to line up with the narrow opening on the north end of the Burlington Northern Santa Fe (BNSF) railroad bridge, located about one mile downstream. This movement is especially difficult during high river levels.

5. **Substandard bicycle and pedestrian facilities**: The bicycle and pedestrian paths on the I-5 bridges are very narrow (four feet wide in most places, decreasing to less than four feet at some locations) and extremely close to traffic and to the steel trusses. Also, the connections to these paths at both ends of the bridges are difficult to follow, especially around the Marine Drive and Hayden Island interchanges, which at times require riders to cross active roadways. Many existing non-motorized facilities cannot be used by persons

with disabilities, and thus do not comply with the Americans with Disabilities Act (ADA) accessibility standards.

6. **Seismic vulnerability**: The I-5 crossing of the Columbia River main stem consists of two bridges, one built in 1917 (the northbound structure) and the other built in 1958 (the southbound structure). The foundations of both bridges rest in soils that could liquefy during a major earthquake. Neither bridge was built to current earthquake safety standards and could be damaged or collapse during a major earthquake.

Economic Impacts

The overall quality of the transportation system is an important factor in the viability of the local and regional economy. For decades, transit has played an important role in maintaining the level of service and operation of the overall regional transportation system, particularly because the region has made a policy commitment to invest in transit improvements rather than expanded highway capacity. But for the overall transportation network to function efficiently, including transit service, significant highway improvements are necessary at times. This is the case with I-5, which is the principal major arterial in Oregon serving statewide transportation needs, including the movement of freight.[8]

Overall, the Columbia River Crossing portion of the South/North Project will result in positive impacts in the Expo Center/Hayden Island Segment because improved transit capacity will be available to support more intensive development in the Jantzen Beach area and the highway improvements, including the new I-5 bridges, improvements to I-5 and its interchanges, and improvements to local roadways in the area, will provide greater accessibility and mobility not just for automobile and truck traffic but also for transit riders, bicyclists and pedestrians. LRT will also offer an alternative to traveling on I-5. However, the long-term benefit must be balanced by the short-term adverse economic impacts associated with the displacement of existing businesses on Hayden Island and in and near North Portland Harbor.

Business Displacements. In every instance where the South/North Project displaces an existing commercial or industrial use, that represents an adverse economic impact. Displacements affect employment, incomes, services and taxes. Even though the adverse impacts associated with displacements in the Expo Center/Hayden Island Segment may not be significant on a region-wide or citywide level, the Metro Council recognizes and is sympathetic to the significance of each displacement at the individual business and community level. The Council understands and acknowledges that relocations can cause significant anxiety and trauma not only to the company being displaced, but also to employees who work for the company.

Given that the South/North Project as a whole, including the Columbia River Project portion of the South/North Project, serves a largely developed urban area, it is impossible to avoid displacement impacts while still providing transit accessibility and highway improvements.

[8] I-5 serves this role for Washington and California as well, as (heading north to south) the freeway extends from the Washington/British Columbia border through major northwest metropolitan centers in Seattle, Tacoma, Olympia, Portland, Salem, Eugene and Medford into northern and southern California and their major urban centers.

To the extent feasible and practicable, the LRT route has been designed to follow existing public road and railroad rights-of-way to minimize displacement impacts. Locations for related facilities such as LRT stations, park-and-ride lots and operations & maintenance facilities also have been selected with the objective of balancing displacement and other adverse impacts with the positive benefits of LRT proximity and service. Highway improvements generally have been located within or next to existing highway right-of-way to minimize displacement impacts.

Oregon Mainland. On the Oregon mainland south of Hayden Island, the Columbia River Crossing Project would displace five businesses in the Marine Drive area: a boat sales business, a boat repair business with an auxiliary boat dock, a billboard operated as a business, and two marine businesses with a total of 25 staff and approximately $10.6 in annual sales revenues. The boat sales business and the two marine-related businesses are dependent upon a location close to the river. Finding suitable locations for boat sales, a boat dock, and the repair and marine-related businesses may be difficult because much of the Columbia River area in the vicinity of freeway access is built up for either residential or industrial/commercial use. ODOT would provide relocation assistance to displaced businesses.

Hayden Island. On Hayden Island, the Columbia River Crossing Project would displace an estimated 39 businesses on Hayden Island with a total of 643 employees and approximately $62.7 million in annual sales revenues. The displacements include a section of restaurant and bar establishments currently between the existing freeway and N Center Drive; a restaurant and an office supply store west of N Center Drive; eateries and a cellular services store north of N Hayden Island Drive; fast food and service establishments along N Jantzen Beach Drive; two cellular arrays run as businesses both east and west of I-5; and the Safeway store east of I-5 between the existing freeway and N Jantzen Drive.

Hayden Island is a regional draw because of the numerous big box retail establishments located west of the freeway and the Jantzen Beach SuperCenter. Although the extent of displacements caused by the project is great, these regional attractors would not be directly affected. The City of Portland has, however, documented a vision for this area in the Hayden Island Plan (City of Portland, adopted August 2009). This plan assumes redevelopment of the SuperCenter property into a Regional Retail Center (called a “Lifestyle Center”) with mixed use and transit-oriented residential to the south. Redevelopment of the property is of interest to its current owners, who have entered into a design process, but planning has been put on hold because of current economic conditions. Even without redevelopment of the property, the retail uses west of the freeway could be assumed to draw regional traffic in the long run.

More important from an economic standpoint is the effect of the project on island residents as customers and/or employees of displaced businesses. The majority of businesses displaced by the project serve mainly local clientele. These include a series of delis and bars west of the freeway; local fast food and sit-down restaurants; retail; and services. The project displaces one of the two banking establishments and the only grocery store on the island. ODOT would work with affected business owners to provide relocation assistance.

The Safeway Grocery Store is the only grocery store on Hayden Island since another grocery store (Zupan's) closed several years ago. The Columbia River Crossing Project may suggest replacement sites for the relocation of Safeway, but it is up to the store owners to choose their replacement location, if any. While Safeway may not relocate on the island, it could be replaced by other grocery stores. Officials representing the Jantzen Beach SuperCenter initiated a site plan review with the City of Portland for a relocation and expansion of the Target store on the island. Plans submitted to the City of Portland's Bureau of Development Review indicate that the Target store would include a grocery and a pharmacy.

Safeway officials have indicated that it would be difficult for the store to relocate to another site on Hayden Island or in the Delta Park area because of the current lack of available sites. They may be able to locate a replacement store in either the North Portland area or South Vancouver. Alternately, Safeway may choose to remodel or expand existing stores in Vancouver or Portland. Relocation of Safeway to the north would mean a permanent loss in tax revenues for the City of Portland. Relocation to either the north or south would mean required travel on I-5 or the local traffic bridge between Hayden Island and North Portland for all customers and employees currently living on the island. Added to this is that movement to another location could reduce the viability of other Safeway stores nearby. Currently there are six other Safeway stores within five miles of the store on Hayden Island. Four of these are in Vancouver and two are in Portland.

The direct impacts on Hayden Island have the potential to significantly affect wage-earning opportunities for those seeking service industry employment. According to the Oregon Employment Department, the average salaries of most food preparation and service workers within Multnomah and Washington Counties fall within the range of $18,000 to $23,000 per year. Wages within this range would lift all individuals and most small families above the federal poverty guidelines and therefore would not constitute an environmental justice impact.

Measures to Mitigate Displacement Impacts. The methods used to determine displacement impacts are described in the Acquisitions Technical Report. A displacement occurs if a use, such as a building or parking lot, is demolished or moved as a result of the project, or if people or a business is no longer able to occupy the building as a result of the project. Individuals or businesses that are displaced from their real or private property would be eligible to receive relocation benefits.

Where property acquisition and residential or business displacements are unavoidable, the project would provide mitigation. These mitigation measures are addressed by federal and state regulations, which require that acquired property be purchased at fair market value and that individuals living in a residence displaced by the project be provided decent, safe, and sanitary replacement housing. Displaced households and businesses would be relocated per the Uniform Relocation and Real Property Acquisitions Policies Act of 1970, as amended (Uniform Act). Under these regulations, relocation experts would:

- explain all relocation programs to the affected businesses;
- assist in preparing and filing reimbursement claims; and

- □ssist in completing forms required by the lending institutions, the Small Business Administration, and others associated with the lease or purchase of new properties.

All properties required for the Columbia River Crossing Project will be acquired at fair market value for land and improvements. If only a portion of a property is required, the acquisition price will also reflect any measurable loss in value to the remaining property due to the partial acquisition. Generally, the relocation process occurs concurrently with the acquisition of affected properties. Relocation benefits vary between residential and business properties and may include payment for actual reasonable expenses of moving a business or personal property and/or other benefits, such as rent supplements, increased interest costs on replacement dwellings, reasonable search costs for new business sites, and business reestablishment costs. Relocation assistance for businesses could include moving costs, site search expenses, business reestablishment expenses, and assistance in locating a replacement business site. The specifics of relocation assistance are determined on an individual basis and are based, in part, upon ownership or tenant status.

Each acquiring agency (TriMet or ODOT) has an established advisory services program to ensure that displaced businesses or persons receive adequate assistance in relocating to a new business site or to decent, safe, and sanitary housing, respectively, with a minimum of hardship. For displaced businesses, such services could include the hiring of an outside specialist to assist in planning the move, making the move, and reinstalling machinery and other personal property. For displaced residents, these advisory services could include supplying information concerning federal and state programs that offer assistance to displaced persons and technical help in applying for such assistance or providing transportation to displaced persons to search for or view replacement housing. These programs work to ensure that the acquiring agency takes advantage of all financial and personal resources available during the relocation process.

The displacement of publicly owned facilities, such as the ODOT permit center, could be mitigated by functionally replacing the property acquired with another facility that would provide equivalent utility. Alternately, such facilities could be provided relocation assistance in a similar fashion as displaced businesses.

In some instances there may be opportunities for minor design modifications to avoid or reduce business displacement impacts. During the preliminary and final engineering processes, engineering staff will try to minimize displacement impacts to the extent practicable through design refinements.

Although there are multiple vacant buildings on the island, including several in and around the Jantzen Beach SuperCenter, the island is limited in its capacity to provide appropriate replacement sites for the 39 businesses that would be displaced by the Project. As a result, many of these businesses may have to relocate outside the main project area. According to the Hayden Island Plan, there are plans to redevelop a portion of the Jantzen Beach SuperCenter site into a high-density mixed-use transit-oriented development supported by the new light rail station. This redevelopment would include new commercial space that could house existing businesses and attract new ones to the island. It is not known when this

redevelopment would occur, and therefore it is not known whether businesses displaced by the Project could be directly relocated to the newly constructed space.

Several measures are potentially available to mitigate for the loss of service industry jobs on Hayden Island. Many large public projects in the region set goals for hiring local contractors, utilizing apprenticeships, and otherwise cooperating with job training programs. The City of Portland has requirements for City projects that pertain to both of these measures as well as the hiring of minority, women-owned, emerging, and disadvantaged businesses. The project could adopt similar goals for construction contracting. The project could include innovative requirements in its construction contracting and contractor selection, with the intent of providing job training and a preference for local services.

Workforce practices can be used to provide experience and business for disadvantaged workers and companies. For instance, apprentices could be used for a percentage of labor during construction. Alternatively, the project could set a goal for the percentage of construction dollars contracted to DBE firms with a focus on those in within the project area.

Lastly, the project could work with TriMet to maintain the existing bus service that regularly connects Hayden Island with nearby grocery and other retail services. This may include additional routing on the island to provide greater transit access during construction. The project could also work with TriMet to maintain paratransit service for qualifying, mobility impaired Hayden Island residents.

The provision of a light rail station, the completion of Tomahawk Drive, the improved I-5 access and capacity of the Hayden Island interchange, and the addition of direct local access on a new local multimodal bridge would provide beneficial land use and economic impacts and would all contribute to the viability and success of the redevelopment plans for the island and mitigate for the business displacements on the island. Additional beneficial effects would result in improvements in the local street network consistent with the Hayden Island Plan.

Loss of Parking/Access. The loss of parking, and loss or change of access can have adverse economic impacts on businesses. If the project must remove an existing access, and if that access cannot be safely and adequately relocated or reconfigured, then the entire business is assumed to be displaced. Even if alternative access is available, it may not be as convenient as the existing access and could result in some loss of business.

Oregon Mainland. On the Oregon mainland there would not be impacts to on-street parking. However, the Expo Center parking lot would be reduced by 280 parking spaces, a reduction of 13 percent of the total parking. This area would be used for landscaping and the realignment of both Marine Drive and the new Expo Center Drive. The Expo Center seldom requires the use of all 2,100 parking stalls and any impacts that could be observed during peak events would likely be offset by the new light rail transit service provided connecting the Expo Center with Vancouver.

The realignment of Marine Drive and the new Expo Center Drive would eliminate parking spaces in a parking lot located on ODOT land, which is currently leased by Diversified Marine for equipment storage. Currently there are approximately 20 unstriped parking spaces

in this parking lot. There is potential for identifying new space on the lessee's property or along property remainders for vehicle storage.

Two existing freight and truck storage businesses would experience impacts to their parcels from construction of the Delta Park to Vancouver Way connection over Martin Luther King Jr. Boulevard, and a connection between Martin Luther King Jr. Boulevard and N Haney Drive via Vancouver Way. These new connections could require relocation of existing access for both parcels. This portion of the Columbia River Crossing Project would reduce the parking capacity on the truck storage parcel south of Vancouver Way by approximately 55 to 60 vehicles, out of a total capacity of around 200 vehicles. Typical utilization is approximately 80 percent. This limits the number of vehicles able to park in the lot and could impact the viability of business at this location. The new roadway alignment bisects the existing storage lot, requiring a new access to be added for the northeastern segment cut off by the new road connecting to Marine Drive. The truck storage and distribution business north of Vancouver Way would lose approximately 50 truck parking spots, out of a total capacity of approximately 400 total spaces. The business could also lose some employee parking in one lot, though there is adequate room to relocate the displaced parking. Additionally, two fuel storage tanks and a refueling area located on the parcel would need to be relocated, potentially impacting existing parking configuration and reducing the number of available parking spaces.

The roadway realignments and extensions in the vicinity of the Marine Drive interchange associated with the Columbia River Crossing Project would improve access and circulation overall, with specific benefit for commercial vehicles accessing the freeway from Marine Drive. The realignment of Marine Drive would still provide circulation to I-5, Vancouver Way, and Martin Luther King Jr. Boulevard. Accessing the existing area of Marine Drive northeast of I-5 would require a minimum level of out-of-direction travel, but access would remain with the development of a new underpass that crosses through Werner Enterprise to Vancouver Way and on to Marine Drive.

A tire business would need to relocate its main entrance off of Vancouver Way to an existing access from N Haney Drive. A freight storage business south of Vancouver Way would need to relocate its entrance between N Haney Drive and the new connection to Marine Drive. Access would be kept open for the manufacturing facilities north of Marine Drive and west of I-5; however a local road would be constructed to preserve access to two businesses. The new Anchor Way extension under I-5 would allow traffic to circulate back onto the major roadways east of I-5 and would provide improved access to the west of I-5 for the businesses along this roadway.

The local traffic bridge connection between North Portland and Hayden Island would provide one lane in each direction over the North Portland Harbor, allowing residents and those accessing Hayden Island from the Oregon mainland an additional access option between the two areas, creating a local connection that currently does not exist. Local traffic near the arterial bridge and the Anchor Way extension could increase as drivers have the option to avoid the highway.

An aggregate gravel business's access and circulation would be modified. The access to the site would be via a driveway from the Anchor Way connection under I-5. Currently vehicles accessing I-5 from the site turn left directly onto Marine Drive. With the Columbia River Crossing Project, traffic accessing I-5 north from the site would go south on the new access road, travel along the east side of the Expo Center parking lot, would turn right on Expo Road and right again on N Force Avenue, and would finally turn right on Marine Drive, accessing I-5 via the SPUI (phased highway option) or the flyover in the Full Build option. This is illustrated in Exhibit 4-5 of the *Economics Technical Report*.

The option of constructing the Bridgeton Trail between Marine Drive and the Columbia River would require a partial acquisition of multiple industrial parcels though no displacements would occur, and no economic impacts are anticipated. Design of the trail would need to consider the potentially conflicting users of freight and recreational bicyclists and pedestrians. Internal circulation within the aggregate gravel business is currently difficult. Some backing of vehicles onto Marine Drive is needed to access certain areas of the site. Left turns are currently allowed onto Marine Drive directly from the business but can be difficult when traffic flows are heavy.

Hayden Island. There is currently no on-street parking on Hayden Island. However, parking lot impacts would be experienced for the following properties adjacent to I-5: Large hotel on N Hayden Island Drive (10 stalls removed of approximately 700); Hotel on N Jantzen Drive (8 stalls of 185); parking lot for floating homes (40 stalls of 200), Jantzen Beach SuperCenter (175 stalls of 1300+). The Jantzen Beach SuperCenter parking lot would have 175 spots permanently removed, but because of the high number of overall parking spaces in the area, the effect of this change would be small – a sufficient supply of parking would remain at the SuperCenter to serve to serve anticipated future need most of the year, and the addition of light rail transit adjacent to the SuperCenter would help offset the small reduction in on-site parking.

Overall, access to Hayden Island would be improved by the Project. The extension of the Yellow MAX Line would provide direct transit service for residents, employees, and customers between the island and both downtown Portland and Vancouver. The two-lane local traffic bridge between Hayden Island and North Portland would also provide an off-highway option for travelers between the island and mainland Oregon. The Project includes widening two east-west local streets, extending N Tomahawk Drive under I-5, and widening N Jantzen Drive. Subsequent plans for the Jantzen Beach Super Center include rearranging the buildings around an extension of N Tomahawk Drive and the development of a new road connecting N Jantzen Drive to N Hayden Island Drive.

The widened N Jantzen Drive between the underpass with I-5 and N Hayden Island Drive to the north would acquire all the existing properties except for a fast food restaurant on the west and the hotel on the east side of N Jantzen Drive. The Project would restrict access to both the hotel and the restaurant to right-in/right-out only movements. The hotel and restaurant along N Jantzen Beach Drive could experience circulation impacts, because the entrances and areas adjacent to the road are currently the primary access and circulation for the businesses. The expansion of the sidewalk along N Jantzen Drive to the east would require reconstruction of

the guest canopy and load/unload area currently facing the street. This is the primary entrance for guests to the hotel, and alterations to the canopy could impact business operations. Access to the large hotel along N Hayden Island Drive would be reduced from three points to one new access opposite the widened N Jantzen Drive. This entrance would also serve banquet services and restaurants located on the property. All four businesses could experience slightly impaired circulation in the parking lot and increased congestion at the entrance. However, the design for N Jantzen Drive extends into the parking lot of the hotel, and could cause internal circulation issues, as the guest loading/unloading canopies and the principal entrance to the hotels would be difficult to maintain with the extension of the street.

The Columbia River Crossing Project team has coordinated with the City of Portland Office of Transportation, Bureau of Planning, the Portland Development Commission, and business owners on Hayden Island (through the development of the Hayden Island Plan and an Interchange Area Management Plan for the I-5/Hayden Island Interchange), to identify an adequate local circulation system, access spacing, and land use policies to manage demand on the interchange.

Although portions of parking lots near the Hayden Island Station could potentially be used as a de facto park-and-ride, the availability of 2900 park-and-ride spaces in Vancouver, Washington should minimize this likelihood. Because there will be a toll for vehicles to cross the bridge, the Council believes and finds that most Washington commuters travelling by light rail would park in Vancouver rather than at Jantzen Beach.

To mitigate for the adverse economic effects of the project, Interchange Area Management Plans (IAMPs) for the Hayden Island and Marine Drive interchanges are currently being developed in coordination with the City of Portland, ODOT, and other stakeholders. These efforts are building off the adopted Hayden Island Plan and the work of the Marine Drive Stakeholders Group. The IAMPs will provide a framework for access management and local circulation decisions in the context of these interchanges.

An Interstate Access Modification Request (IAMR) for the Hayden Island, Marine Drive, and Victory/Denver interchanges is also in preparation. The IAMR is a stand-alone document that includes the necessary supporting information needed for access modification requests to the Interstate System. An IAMR provides the rationale for access modifications to the Interstate System and documents the assumptions and design of the preferred alternative, the planning process, the evaluation of alternatives considered, and the coordination that supports and justifies the request for an access revision.

Tax Base. Local jurisdiction tax bases are affected in two ways by the development of large public infrastructure projects such as South/North light rail. First, and by far the greatest long-term impact, is the development and redevelopment that could occur in conjunction with the project. As this development occurs, the value of the investments are added to the tax base. The effect of this kind of impact is difficult to estimate because it is dependent upon many independent private decisions that would occur in the future. However, the Council finds that the overall impact should be positive.

The second type of impact is the direct impact to tax bases that occurs through property acquisition for construction of the project. Private property is typically acquired by the Project. Through acquisition, this property converts to public property and, as such, is removed from the tax rolls unless resold for private purchase. Often, the short term impacts are minimal, as the loss in value in the tax rolls are offset over time by the expected greater increase in value added to the tax base due to new development in the corridor, specifically in station areas.

As shown below, the Columbia River Crossing Project will have a negative economic impact on the tax base through the displacement of business uses from the tax rolls. However, the Council finds that tax base impacts associated with displacement may be shorter-term because the availability of light rail and highway improvements is expected to spur redevelopment of the commercial area around the Hayden Island Station and could enhance property values and the tax base on a long-term basis.

Oregon Mainland. The five businesses displaced have an estimated right-of-way value of $4.1 million, a property tax impact of $27,000, which is 0.01% of Multnomah County budgeted 2008 property tax revenue.

Hayden Island. The 39 businesses to be displaced have an estimated right-of-way value of $33.3 million, a property tax impact of $219,000, which is 0.10% of Multnomah County budgeted 2008 property tax revenue.

Freight Movement. The area encompassed by the South/North Corridor is of critical importance to the movement of commodities within and through the Portland metropolitan area. The freight movement system in the South/North Corridor is comprised of two primary transportation modes: freight railroads and trucking. Additionally, along the Columbia River, the movement of commodities also relies on water freight movement and air transportation.

There are no rail lines crossed by LRT or the highway improvements in the Oregon portion of the Expo Center/Hayden Island Segment, so there will be no impact on *rail freight movement.*

Truck traffic relies heavily on the major streets and highways in the South/North Corridor and the region, including I-5. The Project is expected to improve traffic conditions in the corridor compared to No-Build and therefore will improve conditions for truck traffic, as addressed in the *Traffic Technical Report.* Daily truck travel demand would be similar for the No-Build and the Project because the movement of freight is substantially related to economic conditions in the region, and freight moved by trucks is not likely to shift travel modes due to congestion. However, truck demands by time of day would likely change because there would be fewer congested hours with the Columbia River Crossing Project, resulting in more trucks during the commuter peak and midday hours.

The Project would result in higher volumes of trucks during midday operations compared to the No-Build Alternative. The reduction in congestion and truck travel occurring throughout the day would mean more flexibility in truck scheduling and improved reliability of truck

shipments**.** Exhibit 7-10 of the Traffic Technical Report summarizes truck volumes by time of day.

Adverse impacts to truck movements in the South/North Corridor include both potential delays due to increased congestion or out-of-direction travel associated with light rail, and the possible loss of on-street loading zones. Localized delays to peak-period truck activity could occur due to increased congestion that would result from reductions in roadway/intersection capacity associated with light rail operations. However, the overall improvement to traffic conditions in the corridor mitigates the localized delays that would occur from light rail.

The roadway realignments and extensions in the vicinity of the Marine Drive interchange associated with the Project would improve access and circulation overall, with specific benefit for commercial vehicles accessing the freeway from Marine Drive. The realignment of Marine Drive would still provide circulation to I-5, Vancouver Way, and Martin Luther King Jr. Boulevard. Accessing the existing area of Marine Drive northeast of I-5 would require a minimum level of out of direction travel, but access would remain with the development of a new underpass that crosses under I-5 to Vancouver Way and on to Marine Drive

The Council finds that the project would improve truck traffic through better local intersection operations and fewer hours of congestion on I-5 compared to the No-Build alternative.

Segments of two navigable waterways are located within the South/North Corridor: the North Portland Harbor and the main Columbia River channel. The United States Coast Guard (USCG) has jurisdiction over navigation within these waterways, and construction of a bridge across these waterways will require the USCG's approval of a bridge permit under Section 9 of the Rivers and Harbors Act of 1899 and the General Bridges Act of 1946, as amended.
The CRC project would have a positive effect on marine commerce on the Columbia River. The existing I-5 bridge structures each have nine piers which result in navigation "channels" between the piers. Three such channels are used for navigation:

- A wide span with approximately 60 feet of mid-span vertical clearance;
- A high span with approximately 70 feet of mid-span vertical clearance; and
- A lift span with approximately 40 feet of mid-span vertical clearance when closed and 180 feet when open.

The wide span is the main channel used for navigation, but during high-water many barges need to use the high span, or require bridge lifts at the lift span. In 2004, there were 604 bridge openings. The proposed I-5 bridges would be high enough to allow the vast majority of vessels to pass without bridge openings. With the exception of a small number of specialized vessels that use the river infrequently, the majority of vessels require vertical clearances of less than 90 feet from the surface of the water to the bottom of the bridge deck. The project team, in consultation with the Coast Guard, established a 95-foot minimum vertical clearance for structures built without a lift span. Vertical clearances greater than 95 feet would raise the bridge structure into restricted airspace for flight navigation. The 95-foot clearance with the LPA will be fixed, not subject to lift restrictions, and accommodate all recreational and commercial vessels. Infrequent trips of marine contractor's cranes will not be accommodated.

Their cranes or cargo may be broken down, at a cost, to meet proposed clearances. Reduced clearances resulting from the project will be mitigated by significantly improved navigational safety.

Currently, bridge openings are restricted to non-peak roadway commute hours. Thus, the new spans would provide more flexibility in operating schedules for marine commerce. The new spans would also eliminate some of the "S-Curve" marine movements currently required for marine traffic to pass under the highway and railroad bridge structures at their highest elevation.

Six piers would support the bridge structures, which is three fewer than exist on the current bridges, thus widening the horizontal clearance of navigation channels. The bridge span length would be 465 feet, with 390 feet of clearance for marine travel between the pile caps, which would be an increase over the width of the "main channel" by 127 feet and a decrease of the "barge channel" width by 121 feet. The current main channel width is 263 feet, and the barge channel has a horizontal clearance of 511 feet. The longer span lengths in the main channel would provide more room for boat captains to maneuver between the piers and improve the inherent safety of marine navigation.

The North Portland Harbor does not include a designated shipping channel, and is largely travelled by recreational boaters and those accessing the water-oriented uses along the Harbor. All of the new structures would have at least as much vertical clearance over the river as the existing North Portland Harbor bridge.

The Council finds that the project will improve marine navigation due to the removal of the "S-Curve" maneuver that currently exists, the removal of bridge lifts and associated restrictions, and the reduction in the number of piers in the river.

Two airports are located near the Columbia River Crossing Project area. Portland International Airport (PDX) is located about three miles southeast of the project on the Oregon side of the Columbia River. It is the major regional airport and serves large commercial passenger and freight service, private aircraft, and the Air National Guard. Planned expansions include both potential runway extensions and the addition of a new runway.

Pearson Field is located directly east of the project on the Washington side of the Columbia River. It serves primarily small piston-engine aircraft weighing 10,000 pounds or less. Because developed urban uses and the Vancouver National Historic Reserve (VNHR) surround it, there are no plans to expand facilities or operations at this airfield.

The lift towers of the existing bridge currently intrude 98 vertical feet into protected airspace for Pearson Field and are an aviation hazard. To avoid the towers, aircraft must use special departure and arrival procedures. The new bridge designs will not include lift towers. The bridges would be located slightly farther from the airfield, and so would intrude less into Pearson Field airspace.

The Council finds that the project will improve aviation safety and efficiency due to the removal of lift spans in Pearson Field's airspace. At worst, the project will have no negative impact to air freight.

Other Economic Impacts. Other economic impacts include the disruption of business during construction, possible loss of property values, possible inability to sell a business or secure loans to pay off mortgages or other business debts due to proximity to the light rail alignment or related light rail facilities, and utility relocations. Construction impacts are addressed in the Short-Term Impacts portion of these findings. The Council finds that generally, there is no required mitigation for temporary economic loss or business interruption during construction of a public project. However, for this specific project, the Council finds that TriMet would be willing to provide staff assistance to impacted property owners in assisting the property owners with their loan refinancing and/or loan application processes. Programs to help businesses affected during construction would include some combination of the following: business planning assistance, marketing and retail consulting, and promotions to generate patronage in construction areas. These programs would be provided by TriMet; similar programs have been employed on recent light rail extension projects. The Council also finds that there may be reductions in property values, but it believes and finds that most of these properties will increase in value over the long term following construction. The Council finds that no mitigation is necessary for possible temporary reductions in property value.

The project will require relocation of certain utility facilities and lines. Utility relocations typically are addressed during preliminary engineering and final design. The Council finds that the costs of relocating utilities impacted by the project are addressed, and can be paid, as provided in existing law.

For some, bridge tolling may constitute an adverse economic impact. Tolling of interstate facilities must be consistent with Title 23 U.S.C. Section 129, the federal law that specifies the circumstances under which interstate facilities may be tolled. The CRC Project qualifies, though tolling on I-205 does not. The Council finds that at this point that tolling will be necessary both to manage congestion and as part of a funding package for the CRC Project along with federal and state funding. It also finds that tolling would likely be beneficial for freight-dependent businesses and businesses that rely on just-in-time deliveries, because the predictability of travel times would improve. However, the greater the toll, the higher the operating costs for truck movements. For other kinds of businesses, tolling will be an additional expense. However, timesavings associated with improved mobility on I-5 will help mitigate that impact.

Concerns have been raised that tolling the I-5 bridge could divert traffic onto the I-205 bridge, increasing congestion and causing added delays on that bridge and its approaches from I-84 and I-205. The Tolling Study Report, released in January 2010, indicates and the Council finds that at the Columbia River, there is an approximate 4.5% shift of auto trips on an all day basis from I-5 to I-205 as compared to a Build-No Toll scenario. More diversion to I-205 is predicted in the off-peak hours when capacity is available than during peak hours. On I-205 south of I-84, the models estimate that diversion will be approximately 1% on an all day basis as compared to the no-build.

While the Tolling Study found, under most of the I-5 only toll scenarios, that the majority of drivers would not change their travel patterns and that most diversion would occur in off-peak hours, the Council finds that the full extent of diversion onto I-205 and associated impacts from tolling on I-5 are not fully known at this time. This will require additional study and analysis as the Project advances. In particular, more refined analysis of traffic demand and patterns will be developed prior to setting the toll rates, and tracking of travel demand and patterns after completion of the Project will allow for adjustment over time. In addition to adjusting the toll rates over time, there will also be adjustments as appropriate to transit service and fares and demand management programs such as incentives for carpooling and vanpooling. These adjustments will mitigate the effects of tolling on travel patterns.

The Council heard testimony questioning the adequacy of the models used to forecast toll traffic and revenues. While the Council recognizes the importance of funding for this Project, it finds that the LUFO process under HB 3478 is a land use decision-making process established to address land use impacts and provide land use authorization for the Project. See HB 3478, Sections 3, 4, 6(1), 7. It finds that the criteria established by LCDC are criteria established for making land use decisions. It further finds that the LUFO process and the LCDC criteria do not address how a project gets paid for and that project funding is not a land use issue.[9] The Council understands that in order to be eligible to obtain federal funding, it must demonstrate that the Project is consistent with land use requirements. These findings demonstrate such compliance.

As explained in the social impact findings below, the Project may affect localized access to properties by police, fire and ambulance vehicles. However, the project should not otherwise increase these governmental services. The Council has seen no evidence to this effect, and it finds that any significant increase in police, fire or emergency medical services as a result of the project is speculative. The Council concludes that no mitigation is necessary in this regard.

Conclusions on Economic Impacts

While the Council is sensitive to the displacement of businesses and loss of existing jobs associated with the Columbia River Crossing Project, the Council finds that, on balance, the Columbia River Crossing Project will result in positive economic impacts in the East Columbia, Kenton, Bridgeton and Hayden Island neighborhoods, particularly because the extension of light rail transit to Hayden Island and northward into Vancouver, Washington will further support commercial development at the Jantzen Beach Center and because highway improvements, including new I-5 bridges with greater capacity, improved I-5 interchanges at Hayden Island, Marine Drive and Victory Boulevard, and better roadway connections to I-5 and between Hayden Island and N Marine Drive will improve access and circulation for companies and businesses in the area. Furthermore, the improvements to I-5

[9] Although the provisions in OAR Chapter 660 do not apply, the Council understands that provisions addressing the timing and financing of transportation improvements are not considered to be land use decisions. See, e.g., OAR 660-012-0040(5).

will substantially reduce delay and improve the movement of freight between Oregon and Washington, improve navigation along the Columbia River, and remove hazards to air navigation associated with the existing I-5 Interstate Bridge lift towers.

The Council also finds that the Project would result in short-term economic benefits with the increase in employment resulting from the construction of the LRT facilities and highway improvements in the Expo Center/Hayden Island segment. The Council finds that there will be a short-term decrease in the tax base due to business displacements. However, the availability of light rail is expected to spur redevelopment of the commercial area around the Hayden Island Station and could enhance property values and the tax base on a long-term basis.

Based on information in the Columbia River Crossing technical reports, the Council finds that adverse economic impacts associated with light rail transit and highway improvements can be mitigated through a variety of means, including relocation assistance programs for displaced businesses and coordination with local jurisdictions and stakeholders. The Council finds that the bridge has been designed to avoid any need for bridge raising or lowering to accommodate river traffic on the Columbia River, and also designed to avoid interference with air navigation using Portland International Airport or Pearson Field Airport in Vancouver.

Tolling issues have yet to be fully resolved and could impact larger portions of the region than just the I-5 corridor. Coordination between the states and regionally among the affected South/North Project local governments could help lead to a more generally accepted resolution of this concern.

Social Impacts

The Council finds that the social impacts of the South/North Project are generally positive in the Expo Center/Hayden Island Segment. Light rail will provide quicker, more reliable and more comfortable transit access to the substantial commercial and employment base at the Jantzen Beach commercial center and to residents of Hayden Island. The highway improvements will improve access and circulation on I-5 and local roads in the area, improving safety, reducing congestion, and increasing mobility of motorists, freight traffic, bicyclists, and pedestrians along the I-5 corridor.

Residential Displacements. As with business displacements, the Council recognizes that in every instance where the South/North Project displaces an existing household, that represents an adverse social impact, and the Council is sympathetic to the significance of each residential displacement. The Council understands and acknowledges that relocations can cause significant anxiety and trauma to families, uprooting them from neighborhoods, schools and friends and imposing change on them.

Given that the South/North Project serves a largely developed urban area, it has been impossible to avoid residential displacement impacts while still providing transit accessibility. To the extent feasible and practicable, the LRT route follows existing public road and railroad rights-of-way to minimize displacement impacts. Locations for related facilities such as LRT stations and park-and-ride lots have also been selected with the objective of balancing

displacement and other adverse impacts with the positive benefits of LRT proximity and service.

The methods used to determine displacement impacts are described in the Acquisition Technical Report and in the discussion of economic impacts above. The same methods applicable to business displacements are relevant to determination of residential displacement impacts and are incorporated by reference. Additionally for residential displacements, federal and state guidelines determine the standards and procedures for providing replacement housing, based on the characteristics of individual households. Eligibility for relocation benefits would be determined after the issuance of the NEPA Record of Decision (ROD) and once the project is granted approval to begin right-of-way acquisition. Relocation assistance could include replacement housing for displaced persons, moving costs, and assistance in locating replacement housing.

Oregon Mainland. Impacts summarized in this section include those between the southern terminus of the project at Victory Boulevard and the south shore of North Portland Harbor. Most of the permanent property impacts in this portion of the project area are due to the highway portion of project, specifically, the realignment of Marine Drive and the addition of local street connections near the Marine Drive interchange.

The transit alignment over North Portland Harbor would result in the displacement of one floating home associated with the parcel adjacent to and west of I-5. The remaining portion of this parcel, not impacted by transit, would be permanently acquired for the highway alignment, which would displace a single-family home with two households on land and two additional floating homes in the harbor. A total of five households would be displaced in this portion of the project area.

Hayden Island. Impacts summarized in this section include those on Hayden Island and associated portions of North Portland Harbor. The permanent acquisition of property would be required in this area to accommodate the reconstruction of the Hayden Island interchange and the extension of light rail over Hayden Island.

The project would have 32 residential displacements on Hayden Island. Twelve of the 32 residential displacements on Hayden Island would be from Row 9 of the Columbia Crossings Jantzen Bay moorage in North Portland Harbor east of I-5. Two of the homes were identified by survey as also containing businesses that would be displaced, as would an additional floating home in this moorage that is used solely for a business. These business displacements are included in the business displacement section of this document. The remaining 20 residential displacements on Hayden Island would occur at rows A, B, and the east side of row C in the Jantzen Beach Moorage, Inc. located in North Portland Harbor west of I-5.

Mitigation of residential displacements could include minor redesign of the project during preliminary and final engineering to avoid or reduce displacements. Some displacements could be mitigated by taking only a portion of the property and/or structure and by modifying the remaining property and/or structure to allow continued occupancy. Where displacements are unavoidable, the project will provide compensation to property owners based on fair

market value and a comprehensive relocation program. The compensation/relocation program for residential properties operates in the same manner as described above for business relocations.

It has been FHWA's and FTA's long-standing policy to actively ensure nondiscrimination under Title VI of the Civil Rights Act. Title VI-related impacts include those impacts which are specific to a protected population under the 1964 Civil Rights Act. Under Title VI and related statutes, each federal agency is required to ensure that no person is excluded from participation in, denied the benefit of, or subjected to discrimination under any program or activity receiving federal financial assistance on the basis of race, color, national origin, age, sex, disability, or religion. Some of these populations (such as the elderly) are not covered by EO 12898, which specifically addresses disproportionately high and adverse effects to minorities and low-income populations.

The Council finds that for the Expo Center/Hayden Island Segments, the data on residential displacements does not suggest disproportionate or discriminatory impacts to environmental justice populations.

Access to Community Facilities. The Columbia River Crossing portion of the South/North Project will improve mobility for Hayden Island residents to travel to and from community facilities and employment centers outside their neighborhood. This is a particular benefit given the absence of other convenient travel options besides the automobile. The Hayden Island Station will improve transit access to the substantial concentration of jobs and commercial services at the Jantzen Beach Center. It will also provide improved transit accessibility and links for Hayden Island residents to local and regional employment centers, community facilities and recreational destinations along the South/North and East/West MAX lines, including employment centers and community facilities in the downtown areas of Portland, Milwaukie, Gresham, Beaverton and Hillsboro. The highway improvements will improve local access and circulation in the area and improve mobility along I-5.

Construction of the Project would displace the Safeway grocery store and pharmacy, which are the only grocery store and pharmacy on the island and are important community resources. While ODOT can suggest replacement sites for the relocation of Safeway, it is up to the store owners to choose their replacement location, if any. While Safeway may not relocate on the island, it could be replaced by other grocery stores. Officials representing the Jantzen Beach SuperCenter initiated a site plan review with the City of Portland for a relocation and expansion of the Target store on the island. Plans submitted to the City of Portland's Bureau of Development Review indicate that the Target store would include a grocery and a pharmacy. During construction, the project would work with TriMet to maintain the existing bus service that regularly connects Hayden Island with nearby grocery and other retail services. This would include additional routing on the island to provide greater transit access during construction. DOTs would also work with TriMet to maintain paratransit service for qualifying, mobility-impaired Hayden Island residents.

Displacement of the Safeway grocery store and pharmacy may disproportionately impact low-income residents who use these services and do not own cars. This impact would be mitigated by the addition of light rail to Oregon and Vancouver.

The displacement of the Safeway store would also displace an extremely active bottle return center. The store managers report over $10,000 each week paid out through the returns. Although it limits each patron to only $7.20 in returns per day, this bottle return center provides an opportunity for individuals to generate income. There are other locations where bottles can be returned on the island and in north Portland. Many of these smaller establishments (such as convenience marts) also enforce limits on the number of bottle returns per visit. However, as long as these businesses continue to operate and proper access to them is maintained, displacement of the return center at Safeway would not result in a high degree of impact.

To mitigate for the displacement of the Safeway bottle return center, the project could provide some written and posted guidance before the closure of the Safeway return center. The guidance would provide community members with alternate bottle-return locations, and directions for getting to these locations. In the event that there would be no other return center on the island, the project could work with an appropriate business site to provide this service.

Barriers to Neighborhood Interaction. The Council finds that the LRT alignment will not result in barriers to neighborhood interaction, primarily because the alignment in large measure parallels the I-5 freeway that already functions as an edge and boundary to the local neighborhoods. Similarly, the Council finds that the highway improvements generally improve existing roadways that either already create barriers to neighborhood interaction (e.g., I-5) or provide convenient access and circulation within and between the affected neighborhoods. The bicycle and pedestrian lanes on the new northbound I-5 bridge will improve interaction between north Portland and Vancouver, Washington neighborhoods.

Safety and Security. The Council is sensitive to the importance of safety and security in neighborhoods affected in particular by the light rail components of the South/North Project. For the South/North Project as a whole to succeed, passengers must feel safe using the stations and trains. The Council finds that with appropriate location and design, and with implementation of system-wide transit security measures as described below, safety and security would not be adversely affected by any of the LRT stations or park-and-ride facilities.

The extension of light rail north from its existing terminus at the Expo Center would cross several intersections at grade. Train frequency in the peak periods is estimated to have 7.5-minute headways with greater headways during off-peak periods. Positive traffic control such as signalization, signage and pedestrian treatments would be used to enhance the safety of other vehicles, pedestrians and bicyclists traveling near light rail vehicles. Transit security on vehicles and at stations and park and ride lots would also be addressed during the design, construction, and operational phases of the project. Examples of safety and security measures which may be designed into the project include:

- Physical barriers such as medians, fencing, landscaping, or chain and bollard (short, vertical posts) to help channel automobiles, pedestrians and bicyclists
- Signage, tactile pavers, audio warnings, and pavement markings at track crossings to alert individuals they are approaching tracks

- Active treatments such as flashing lights, bells, and illuminated and audible warning devices in traffic signals
- The creation of inviting, well-lighted platforms and station areas
- Maintaining clear sight lines for oncoming trains
- Implementing a public safety education campaign before the start of rail service

TriMet has adopted a system-wide Transit Security Plan that applies community policing techniques to transit security. Elements of the Transit Security Plan that will be incorporated into the design and operation of the light rail line serving the Expo Center/Hayden Island Segments include: increased in-house training of transit district employees in crime prevention; a high level of coordination with local law enforcement agencies and personnel; improved facility design and operation standards to increase visibility and security enforcement levels, and investment in new tracking and surveillance technology.

The Council further finds that security lighting will be provided at station platforms and that landscape design will ensure consideration of safety and security Additional potential mitigation measures include emergency call boxes and monitoring/surveillance cameras.
Strategies such as crime prevention through environmental design (CPTED) and the use of police, private security patrols, and security cameras could be employed as appropriate to make the light rail facilities as safe and secure as possible. The existing policies and procedures developed by TriMet and FTA for operations during a potential catastrophic event and to prevent terrorist activities would be expanded to include the Columbia River Crossing Project. Finally, design criteria such as platform location and length, pedestrian crossings, and alignment design would be used to ensure that the project operates safely.

Localized access to properties by fire, police and ambulance vehicles could be affected by changes in local street configurations throughout the corridor. The current level of design reflects consideration of access by emergency vehicles (e.g., street and bike path dimensions, proximity to emergency facilities, primary access routes for emergency vehicles, etc.)

The Council finds that, with appropriate design and implementation of systemwide transit security measures identified above, safety and security will not be adversely affected by the LRT station in the Expo Center/Hayden Island Segment. The Hayden Island Station will be elevated to the level of I-5. The final design of the LRT station will include careful consideration of security concerns. Security lighting and landscape design will ensure consideration of safety and security.

Visual/Aesthetic. The Columbia River Crossing Project will result in impacts to visual and aesthetic resources in the Expo Center/Hayden Island Segment as a consequence of introducing:

- Cut/fill slopes, bridges, overhead structures, sound/retaining walls, catenary poles and overhead wires;
- A light rail station at Hayden Island;
- New I-5 bridges and interchanges;

- New North Portland Harbor bridges;
- Improvements and modifications to existing structures, roads, vegetation, topography;
- Disruptions of existing visual resources, viewpoints, view corridors and vistas; and
- New views.

Impacts to the Columbia River main channel would be mostly positive. Potential impacts would include:

- Removal of the visually complicated truss structures and lift towers of the existing I-5 bridges, which obstruct views from the river, from the Interstate bridges themselves, and from the shoreline. This action would remove an important contributor to the area's historic context (the I-5 bridges) and a character-defining aspect of interstate travel.
- From I-5, views of the Portland and Vancouver skylines, distant shorelines, rolling hills, and mountain profiles would generally improve. Toward I-5, views of open water and shorelines from shoreline-level and elevated viewpoints would also generally improve.
- Removal of the lift towers would be interpreted to have a generally positive visual impact on views from downtown Vancouver.
- Modifications to interchanges would increase heights at the Marine Drive and Hayden Island interchanges, where new ramps and elevated roadways would be higher than any existing facilities in these immediate areas. Even at these interchanges, the degree of change is expected to be moderate, since these areas are already and would continue to be large urban interchanges.
- Removal of the existing bridge structures that currently obstruct views of much of the area immediately beneath the bridges, along the river, This would provide for more light and vegetation under the bridges. These elements would all provide positive visual changes to the immediate area and adjacent areas.

North Portland Harbor would experience moderately negative visual impacts from the addition of piers for the light rail transit bridge and collector/distributor ramps; these would clutter views along the slough and reduce views of open water.

Given the types of visual impacts summarized in the *Visual and Aesthetics Technical Report,* the Council finds that the following strategies can be used to reduce adverse visual impacts to affected neighborhoods:

- Planting vegetation, street trees, and landscaping for screening or visual quality. The project will adhere to a green-over-grey approach for treatment of many new structures, using climbing vines and non-invasive ivies, where practicable.
- Designing landscape plans and other visual treatments consistent with adopted guidance and plans.
- Shielding station and facility lighting from nearby residences and the night sky.
- Minimizing structural bulk, such as for ramps and columns.
- Designing architectural features to blend with the surrounding community context.

- Placement of public art (to be relocated when necessary and added as part of transit stations and gateways).
- Where practicable, integrating lighting with facilities in a manner that produces a positive visual and aesthetic impact, reduces night sky light pollution, reduces possible light trespass into residential units, and contributes to crime prevention through environmental design (CPTED).
- Utilizing the UDAG Design Guidelines, as well as design guidelines of the City of Portland and Tri-Met.
- Selecting new and replacement pole and utility cabinet locations, colors, and styles in relation to their context and in accordance with municipal lighting standards.

In each affected neighborhood, the Council recognizes that potential mitigation measures will vary to fit neighborhood scale, character and concerns. In some neighborhoods, potential measures could improve the visual character of impacted areas. In other areas, the Columbia River Crossing portion of the South/North Project will be a prominent visual feature even with mitigation.

The area from Victory Boulevard, the Expo Center and Marine Drive north to Hayden Island and the Columbia River consists primarily of a major interstate freeway with connecting arterials, a busy, auto-dominated commercial strip, and large, dramatic expanse of open water. The area from Victory Boulevard to Marine Drive has industrial, recreational, and transit developments scattered throughout the area amid large tracts of open space. Commercial development patterns on Hayden Island have obscured natural features to the point where any connection to water or natural landforms is not visually apparent unless one is on the shoreline. Throughout this segment, many signs and utility poles; constant, fast traffic and noise; scattered moderate and large-scale commercial structures; and the artificial landforms associated with I-5 create a coarsely textured, complex environment with a confusing visual character. The breadth and openness of the Columbia River provides visual contrast to an otherwise cluttered visual environment.

Dominant visual features in this segment include I-5, Delta Park, the Vanport wetlands, the North Portland Harbor, Jantzen Beach Center, the historic I-5 truss bridge between Hayden Island and Vancouver, Washington and the wide, flat and open stretch of the Columbia River. The river is a significant regional resource and the dominant visual element within this segment because of its large scale and openness. It also serves as a dramatic gateway between Oregon and Washington.

LRT improvements in the Expo Center/Hayden Island Segment include a good deal of bridging. The bridges over the North Portland Harbor would remove structures, including floating homes and vegetation, along both banks of the harbor, and interrupt views south from Hayden Island to the west hills. The light rail alignment then parallels the west side of I-5, removing commercial structures along that side of the freeway

In general, the Council finds that the impacts to views would vary within the Columbia River Crossing portion of the project area. Impacts to the Columbia River main channel would be mostly positive, as described above. Impacts to North Portland Harbor would be moderately

negative, with the addition of more bridges across the harbor. Impacts to the area from Victory Boulevard to Marine Drive would be low.

The Council finds that possible measures that could mitigate the adverse impacts of the new bridges on views include those described above. Appropriate conditions can be imposed through the local review process consistent with Section 8(1)(b) of HB 3478 to avoid or mitigate adverse impacts on designated scenic resources and viewpoints.

Other Social Impacts. Other social impacts include loss of property values, property acquisitions not requiring displacements, loss of trees along roadsides and in neighborhoods, increase in electric and magnetic fields (EMF) and perceived reductions in "quality of life" associated with light rail transit and highway improvements, both during construction and in the long term. Construction impacts are addressed in the Short-Term Impacts portion of these findings. The Council finds that there may be reductions in property values, especially during the construction phase, but it believes that most of these properties will increase in value following completion of construction. The Council also finds that residing immediately next to the alignment or a station may result in some property owners experiencing perceived reductions in quality of life. Others may see a reduction in quality of life associated with increased density that might result from the proximity of rail to an area. These are very subjective matters that can vary from individual to individual. Landscaping and noise barriers might help mitigate adverse impacts. Where trees are removed, potential mitigation includes equivalent tree replacement. Extension of the light rail system would generate EMF and could increase exposure, however, in those locations where people could be exposed (within and near the light rail right-of-way, near substations, or in the light rail vehicles), EMF emissions would be below exposure guidelines. Because light rail electric power substations tend to generate the highest EMF intensities in the field measurements, the substations have been designed and sited to minimize exposure to users of the system, the general public, and sensitive users.

Social benefits include cleaner air by providing improved transit access in the region, resulting in less automobile driving than would otherwise occur and less congestion and air pollution. Cleaner air also is provided by decreasing congestion through improvements to the highway system. Social benefits also include improved quality of life from lower and more reliable transit travel times, resulting in more time for people to spend doing things other than commuting.

A greenhouse gas emissions analysis was prepared for the Columbia River Crossing Project and is detailed in the Energy Technical Report. The report includes a macroscale analysis to provide a picture of the regional emissions, as well as a microscale analysis that focuses more on the project area. The Project is expected to reduce regional emissions by approximately 130 metric tons of CO_2e /day, which equates to a reduction of approximately 0.5 percent. For the 12.2-mile length of I-5 surrounding the CRC project area, the Project is expected to reduce emissions by roughly 21 metric tons of carbon dioxide equivalent during the AM and PM peak periods, or 5.4 percent.

The differences in long-term effects on water quality between the Project and the No-Build Alternative are substantial. Although the total amount of pollution generating impervious

surface would slightly increase for the Project, the amount of untreated impervious surface would drop dramatically compared to existing conditions and the No-Build Alternative. This is because under the Project, stormwater runoff from all new or reconstructed impervious surface area would be treated, while stormwater runoff from most of the existing PGIS does not currently undergo stormwater treatment.

Payment of the new highway toll would require a higher proportion of income for lower income drivers than for higher income drivers. The Council finds, however, that when considered in combination with the other elements of the project, the impact would not be high and adverse. In exchange for the toll, travelers would receive the benefits of shorter highway travel times, lower congestion, extended light rail transit service, more reliable commute trips, reduced crashes, no bridge lift interruptions, increased access to employment, housing, education and services, and improved biking and walking facilities. There would also be toll-free options for crossing the river, including transit, carpooling, biking or walking, and crossing on I-205. The toll rate is also reduced during the off-peak travel times.

The project team reviewed the available research to inform the environmental justice impact evaluation. Several academic studies have been conducted on equity and tolling. The Washington State Department of Transportation (WSDOT) also conducted research on tolling equity for various projects.

The University of Washington and the Washington State Transportation Center published in 2009 a research paper entitled "The Impacts Of Tolling On Low-Income Persons In The Puget Sound Region." The paper starts with the assertion that "Tolls may be progressive, regressive, or neutral, depending on the social and geographic characteristics of the town or region and the structure of the tolling regime. The distributional effects must be evaluated on a site and project specific basis."

In "International Experiences with Congestion Pricing" (May 1993), Anthony May considered the equity component of congestion pricing. He cited older studies that argue that congestion pricing is a regressive measure that has greater impacts on lower-income drivers, but indicated this population is more likely to travel by bus or foot. May concluded that the most inequitable effects are dependent on the pricing scheme implemented and would likely impact a small percentage of lower-income drivers. He suggests that the only way to address the issue of equity is to invest some of the toll revenue in public transport rather than solely to improve the road infrastructure. The Project includes substantial improvements to transit as well as bicycle and pedestrian facilities.

Existing electronic toll collection systems with transponders present various hurdles for low-income users. One must normally either pay a deposit or link the account to a credit card or bank account. Some low-income populations may not be able to purchase a transponder. Not being able to purchase a transponder due to large set-up fees or lack of a credit card and/or bank account would be an adverse impact on those low-income populations affected. A similar barrier may exist when new tolls are instituted in areas where some groups and individuals lack the English language skills to understand the complex tolling system. These impacts would be mitigated through outreach and special programs.

Several strategies would mitigate the potential impacts of tolling on low-income populations. Since toll transponders are unfamiliar to most Oregon and southwest Washington residents, educational materials can be made available that explain how tolling and transponders work. All such communications would be made available in selected non-English languages, as appropriate. C-TRAN offers programs that assist low-income populations and people with disabilities to obtain a reduced transit fare. TriMet offers similar programs that assist senior and disabled populations using transit.

Conclusions on Social Impacts. The Council finds the social impacts of the Columbia River Crossing project are generally positive in the affected East Columbia, Kenton, Bridgeton and Hayden Island neighborhoods. There are 46 potential residential displacements in these segments.

Relative to access to community facilities, the project would displace the only grocery store and pharmacy (Safeway) on Hayden Island. The displacement could also affect low-income populations that use the bottle return center. However, the Council finds that the improved transit access, improvement of the local street network, and a bridge providing local multimodal access to and from the island, as well as the other mitigation measures mentioned above, would mitigate the displacement of the Safeway.

Relative to barriers to neighborhood interaction, the Council finds that the LRT alignment will not result in barriers to neighborhood interaction, primarily because the alignment in large measure parallels the I-5 freeway which already functions as an edge and boundary to the Hayden Island Neighborhood. Similarly, the highway improvements generally expand or improve existing roadways.

Relative to safety and security impacts, the Council acknowledges and supports TriMet's continuing efforts to improve passenger and community safety throughout its service area. The Council finds that TriMet is committed to making continued improvements to help maintain a safe and effective transit system, and it finds that the measures identified above improve public safety.

Relative to the visual impacts, the Council finds that the project would result in positive and negative impacts. The negative impacts could be mitigated by the measures addressed above, including following existing design guidelines from the City of Portland and TriMet when designing the light rail and highway improvements.

Traffic Impacts

The *Transit Technical Report*, *Traffic Technical Report* and Section 3.1 Transportation of the Draft Environmental Impact Statement (DEIS) evaluate the Project's impacts to the highway and street network. Traffic impacts from transit and highway improvements and potential mitigation are summarized below.

Transit. The Council finds that the light rail route and station on Hayden Island will provide light rail proximity and service to the substantial employment and commercial base located at the Jantzen Beach Center. Additionally, through improved high capacity transit service, island

residents will have improved accessibility to local and regional employment centers, community facilities and recreational destinations throughout the Portland metropolitan region.

Currently, travel options to and from Hayden Island are limited and often congested, and under the DEIS No-Build alternative, these options would get much worse over time. Light rail will provide a convenient, reliable alternative mode of travel.

The Columbia River Crossing Project would more than double the number of transit passenger trips over the I-5 crossing, compared to the 2030 No-Build Alternative. For weekdays, there would be 20,600 bridge crossings on transit, compared to 10,200 trips under the 2030 No-Build Alternative. Of the transit passengers crossing the Columbia River, 18,700 would be on light rail transit (91 percent) and 1,900 would be on buses (9 percent).

One of the major contributing factors to reliable transit service is reserved or separated right-of-way for transit vehicles. Transit vehicles operating in mixed traffic are subject to delays caused by accidents, breakdowns, congestion, and in the case of existing I-5 Columbia River bridges, bridge openings. With a separated right-of-way and separated bridge crossing on the lower deck of the new southbound I-5 bridge, transit service between Portland and Vancouver, Washington will become faster and more reliable. For example, a transit trip between Hayden Island and Vancouver would save an estimated five minutes in comparison with the No-Build Alternative, while a trip between Pioneer Square and Clark College would save 28 minutes (dropping from 72 minutes with the No-Build to 44 minutes with LRT).

Additionally, most of the intersections within the South/North Corridor through which light rail vehicles will operate have traffic signals preempted for LRT, have gated crossings for LRT, or have LRT separated from other traffic. In summary, the Columbia River Crossing portion of the South/North Project will provide significantly more reliable transit service than the No-Build Alternative, and a significant portion of the corridor's transit riders will experience the improvement in reliability with light rail.

Transit improvements in the Expo Center/Hayden Island segments of the South/North Project could affect traffic congestion in two basic ways. First, these improvements could divert trips from automobiles to transit, resulting in reduced systemwide vehicular travel. Second, transit facilities could also affect localized traffic operations on highways and streets in the study area.

The LRT alignment will have an at-grade crossing with the extension of N Vancouver Way, at the south end of the local multimodal bridge. Traffic analysis performed for the *Traffic Technical Report* models that this intersection will operate acceptably (meeting City of Portland Bureau of Transportation standards) in design year 2030. Light rail will be grade-separated on Hayden Island, with no traffic impacts on the island. The LRT alignment will bridge over N Jantzen Avenue and N Jantzen Drive, and Hayden Island Drive and N Tomahawk Island Drive (to be constructed as part of the project). Given the design, the Council concludes that the Columbia River Crossing transit portion of the South/North Project will not result in adverse traffic impacts in the Expo Center/Hayden Island Segment.

The traffic analysis model shows only one intersection in Oregon as not meeting the appropriate jurisdictional standards. The intersection, Going Street and Interstate Avenue, will not meet Portland Bureau of Transportation standards in 2030. Potential mitigation could be to optimize the light rail transit pre-emption at the intersection, install advanced signal controllers to manage light rail transit pre-emption, and change the westbound right lane into a through/right choice lane to allow traffic to continue westbound.

Regarding traffic safety, light rail transit is designed to be safe through methods and devices such as speed control, signalization, gated crossings, and pedestrian movement controls. In general, light rail vehicle speeds match road vehicle speeds where the vehicles run in adjacent lanes. Light rail vehicles operate in accordance with normal traffic control devices (traffic signals) as supplemented by specific light rail signals where needed. Specific train warning signals may be provided as needed. Pedestrian movements are governed by pedestrian signals at signalized intersections. At gated intersections, pedestrian movements are controlled by the gates and warning signals. At non-signalized, non-gated pedestrian crossings, barriers ("z-crossings") may be used to focus pedestrian attention on the direction of approaching light rail vehicles. The project could provide pedestrian access to stations by establishing "through-walking areas"—clear pathways free of street furniture or other impediments—adjacent to the planned station locations. The project would strive to maintain the width of these areas at approximately 7 to 8 feet in busy pedestrian locations and 6 feet in areas with lower levels of pedestrian traffic. For bicycles, station areas could include bicycle facilities, which could include secure storage areas. The Council concludes that these methods and devices provide for a safe multi-modal environment.

Highway Improvements. Since the stated purpose from the DEIS of the Columbia River Crossing project is "to improve I-5 corridor mobility by addressing present and future travel demand and mobility needs in the CRC Bridge Influence Area," most project impacts to traffic are positive. The associated highway improvements in the segment are provided as part of the Columbia River Crossing Project in order to improve transportation performance compared to the No-Build alternative.[10]

In 2030 the traffic models predict 15 hours of congestion per day (northbound and southbound) on I-5. With the Columbia River Crossing Project, there would be just 3.5 to 5.5 hours of congestion in 2030. During the peak period, the Project would increase the number of people over the I-5 crossing northbound in 2030 from 26,500 with No-Build to 35,300 (in vehicles), and from 2,200 to 6,100 (on transit).

Local street traffic performance is monitored and measured by the City of Portland and ODOT based on established performance standards for the facilities under their respective

[10] House Bill 3478, Section 8(1)(a), directs all affected local governments and special districts to amend their comprehensive or functional plans, including transportation system plans, "to the extent necessary to make them consistent with a land use final order." As noted below and in Section 1.3 of these findings, most of the highway improvements included in the Project are already identified and authorized in the City of Portland's acknowledged Transportation System Plan. As such, they already have land use approval. They are addressed in these findings because they are included as part of the Columbia River Crossing Project which, as an element of the South/North Project, requires findings of compliance with the applicable criteria for any "highway improvements". For these improvements, no further local planning action is necessary to make them consistent with this 2011 LUFO. For those highway improvements that are not already part of Portland's Transportation System Plan, the city will need to amend its plan to comply with Section 8(1)(a).

jurisdictions. Local street congestion is most intense near the I-5 ramps and is influenced by the travel direction and length of time that I-5 is congested during each weekday. This section summarizes existing local street performance at selected study intersections. Results are reported for the AM and PM peak hours of travel.

The Project would address most of the non-standard geometric and safety design features currently existing on the I-5 mainline and ramps within the main project area. Improvements would be made to the existing short on-ramp merges/acceleration lanes and off-ramp diverges/deceleration distances, short weaving areas, substandard lane widths, vertical and horizontal curves that limit sight distance, and narrow or non-existent shoulders. The Project would remove both Interstate Bridge lift spans. In addition, the Project would substantially reduce traffic congestion compared to No-Build conditions.

As the number of vehicular collisions in the main project area is related to the presence of non-standard geometric design and safety features, which is exacerbated when traffic levels are at or near congested conditions, the Project would substantially improve traffic safety in the area. It is estimated that the Project would reduce average annual yearly collisions in the main project area from 750 under the No-Build Alternative to between 210 and 240.

This estimate was calculated by making the assumption that the highway geometric and safety improvements would result in a highway corridor that performed at least as good as an average, similar type of urban interstate facility in Oregon. The collision rate for similar urban, interstate facilities is approximately 0.55 collisions per million vehicle miles travelled (MVMT). Applying this rate (with an allowance for a higher collision rate during congested periods and during late evening and early morning hours) to the forecasted traffic volumes over a year period generated an estimated annual collision total of between 210 and 240.

The Portland local street system is divided by I-5, with community connections across I-5 limited to the following interchange and non-interchange crossing locations: Skidmore Street, Alberta Street, Killingsworth Street, Ainsworth Street, Rosa Parks Way, Lombard Street, Columbia Boulevard, Schmeer Road, Victory Boulevard, Martin Luther King Jr. Boulevard, Pier 99 Street, Jantzen Street, and Hayden Island Drive (overcrossings for non-motorized travel also exist at Failing Street and Bryant/Saratoga Streets). In addition to the interchanges, several local streets and nearby intersections are affected by traffic operations in the I-5 corridor.

Under 2030 No-Build conditions, 25 intersections were analyzed, one of which would not meet applicable performance standards during the morning peak hour - the intersection of Fremont Street with Martin Luther King Jr. Boulevard. During the afternoon/evening peak hour, five intersections would not meet applicable performance standards: Martin Luther King Jr. Boulevard with Fremont and Alberta Streets, Interstate Avenue with Argyle and Going Streets, and Marine Way with Vancouver Avenue.

With the Project, Portland's local street operations would improve along the I-5 corridor relative to No-Build conditions. For example, at the I-5 interchange with Marine Drive, 2030 afternoon peak intersection performance would improve from V/C 0.82 (LOS F) with the No-

Build Alternative to V/C 0.42 (LOS B) with the Project. This indicates that the Project would improve mobility and accessibility to this freight and employment corridor during the afternoon peak. Similar findings were observed during the morning peak. The Project with highway phasing would improve the 2030 p.m. peak V/C to 0.64 (LOS B) from 0.82 (LOS F).

With the Project improvements, the total number of local intersections and ramps would increase to 38, primarily as a result of additional intersections associated with the local roads in the Hayden Island and Marine Drive interchange areas. During the 2030 morning peak hour, 37 of these 38 intersections and ramps are expected to operate within acceptable standards, while one would fail to meet standards. The intersection of Interstate Avenue with Going Street is expected to fail to meet applicable performance standards and to require mitigation. During the 2030 afternoon/evening peak hour, with Project improvements, all intersections would operate within acceptable standards. Potential mitigation for the Interstate Avenue and Going Street intersection (also described above in the Transit section) could be to optimize the light rail transit pre-emption at the intersection, install advanced signal controllers to manage light rail transit pre-emption, and change the westbound right lane into a through/right choice lane to allow traffic to continue westbound.

The existing pedestrian and bicycle facilities throughout the Columbia River Crossing main project area are outdated, potentially unsafe, and confusing to navigate. The width of the shared-use pedestrian and bicycle facility on the I-5 bridge is non-standard (generally no wider than 4 feet) and separated from traffic by the bridge girders and non-standard low barriers. The mixing of pedestrians and bicycles in this narrow facility can cause safety problems. The Project would improve bicycle and pedestrian facilities in the area, as described in the *Traffic Technical Report*, resulting in greater use of the facilities and safety improvements.

Several pedestrian and bicycle forecasting scenarios predict that pedestrian and bicycle travel demands would increase substantially if a new I-5 bridge is constructed with sufficient multimodal facilities. Pedestrian travel across the bridge would be expected to increase from 80 daily pedestrians today to between 600 and 1,000 daily walkers in 2030, an increase of 650 to 1,150 percent. The number of bicyclists predicted to use the crossing would increase from 370 today to between 900 and 6,400 riders in 2030, an increase of between 150 and over 1,600 percent.

The majority of the Project transit and highway improvements are identified in Metro's Regional Transportation Plan and in the City of Portland Transportation System Plan (TSP) and are therefore consistent with those transportation system plans. Below is a list and description of the RTP and TSP projects for which the Project would build the improvements:

Regional Transportation Plan (Metro)

- **RTP Project 10893: Improve I-5/Columbia River Bridge (Victory Boulevard to Washington State Line);** *Replace I-5/Columbia River bridges and improve interchanges on I-5.* New bridges will replace the existing I-5 bridges and the

following I-5 interchanges in Oregon will be improved: Victory Boulevard, Marine Drive, Hayden Island/Jantzen Beach

- **RTP Project 10902: MAX Light Rail: Yellow Line: CRC/I-5 North Extension** *CRC: Expo to Vancouver, north on Main to Lincoln.* Light rail will be extended from the Expo Center MAX station in Portland to a station and park-and-ride lot at Clark College in Vancouver.
- **RPT Project 11032: Ruby Junction light rail operating base expansion**: *LRV maintenance and storage facility, including expansion on the west side of Eleven Mile Avenue. Capital cost is included in Milwaukie and CRC projects.* Ruby Junction maintenance facility in Gresham will be expanded to accommodate a new operations facility, new storage tracks and additional light rail vehicles.

Transportation System Plan (Portland)

- **TSP Project 30018: Hayden Island: Street Network Improvements.** *Provide a street network plan for improvements that implement the Region 2040 connectivity standards and improve multi-modal access for Hayden Island.* The Hayden Island Street Plan is described in more detail in the Hayden Island Plan which was adopted into the City Comprehensive Plan in August 2009. The Hayden Island Plan recommends amending the TSP to implement the street network as shown in the document. The Columbia River Crossing Project would build these improvements consistent with the Hayden Island Street Plan.
- **TSP Project 30020: I-5 (Columbia River-Columbia Blvd): Bridge Widening** *Improve I-5/Columbia River bridge (local share of joint project) based on recommendations in I-5 Trade Corridor Study. Project addresses a high congestion location.* The Columbia River Crossing Project would build these improvement
- **TSP Project 30033: Light Rail Extension - Phase 2.** *Extend light rail service from Expo Center to Vancouver WA.* The Columbia River Crossing Project would build these improvements.
- **TSP Project 40080: Marine Dr. (6th - 33rd & Gantenbein - Vancouver Way) Bikeway** *Retrofit bike lanes to existing street and complete off-street paths in missing locations.* The Columbia River Crossing Project would build these improvements.

The CRC project also includes improvements to the local street system east and west of the Marine Drive interchange and a new bridge over North Portland Harbor to the west of I-5 that would carry light rail vehicles as well as local motor vehicle and bicycle/pedestrian traffic between Marine Drive and Hayden Island. The local street improvements east and west of the Marine Drive Interchange will improve local access to and from the Expo Center and Hayden Island light rail stations and are necessary as well to accommodate the design of the new I-5 bridges and the modified interchanges.

The physical and operational elements of the Columbia River Crossing Project provide the greatest Transportation Demand Management (TDM) opportunities by promoting other modes to fulfill more of the travel needs in the project corridor. These include:

- Major new light rail line in exclusive right-of-way, as well as express bus and feeder routes.
- Modern bicycle and pedestrian facilities that accommodate more bicyclists and pedestrians, and improve connectivity, safety, and travel time.
- Park and ride lots and garages.
- A variable toll on the highway crossing.

In addition to these fundamental elements of the project, facilities and equipment would be implemented that could help existing or expanded Transportation System Management (TSM) programs maximize capacity and efficiency of the system. These include:

- Replacement or expanded variable message signs or other traveler information systems in the Project area.
- Expanded incident response capabilities.
- Queue jumps or bypass lanes for transit vehicles where multi-lane approaches are provided at ramp signals for entrance ramps.
- Expanded traveler information systems with additional traffic monitoring equipment and cameras.
- Active traffic management

Conclusions on Traffic Impacts. The Council finds that the transit and highway improvements summarized above will substantially improve traffic operations in 2030 compared to the No-Build Alternative and that adverse traffic impacts associated with extending light rail transit through this Segment can be mitigated. The Council finds that the potential mitigation for the Interstate Avenue and Going Street intersection would mitigate for the reduction in intersection performance as a result of the project. Potential mitigation could be to optimize the light rail transit pre-emption at the intersection, install advanced signal controllers to manage light rail transit pre-emption, and change the westbound right lane into a through/right choice lane to allow traffic to continue westbound.

The Council finds that transit improvements will increase transit ridership, decrease transit travel times, and improve accessibility to local and regional employment centers, community facilities and recreational destinations throughout the Portland metropolitan region.

Relative to general transit safety and transit impacts on bicycle and pedestrians, the Council finds that the impacts could be mitigated through the measures described above. Relative to impacts from highway improvements, the Council finds that most impacts from the Columbia River Crossing portion of the North/South project would be positive and would improve transportation performance in the Hayden Island/Expo Center segment.

Provide for a light rail route and associated facilities, balancing the need for light rail proximity and service to areas that are capable of enhancing transit ridership; the likely contribution of light rail proximity and service to the development of an efficient and compact urban form; and the need to protect affected neighborhoods from the identified adverse impacts.

The South/North Steering Committee initially assembled in the 1990s to recommend the federal Locally Preferred Strategy adopted the following goal for the project[11]: *To implement a major transit expansion program in the South/North Corridor that supports bi-state land use goals, optimizes the transportation system, is environmentally sensitive, reflects community values and is fiscally responsive.* That "LPS Steering Committee" also adopted the following objectives for the project:

1. Provide high quality transit service;
2. Ensure effective transit system operations;
3. Maximize the ability of the transit system to accommodate future growth in travel;
4. Minimize traffic congestion and traffic infiltration through neighborhoods;
5. Promote desired land use patterns and development;
6. Provide a fiscally stable and financially efficient transit system; and
7. Maximize the efficiency and environmental sensitivity of the engineering design of the proposed project.

The project goal and objectives closely parallel the emphasis of Criterion 3(A) for this Land Use Final Order. The effectiveness evaluation of the South/North Project relative to meeting the objectives is summarized below.

Ability to Provide High Quality Transit Service. The Council finds that the portions of South/North Project already constructed or currently under construction provide a significant amount of light rail coverage between the Portland downtown and Milwaukie and Clackamas Town Center to the south and between the Portland downtown and the Expo Center to the north. The Columbia River Crossing Project provides the missing piece to the original transit concept by extending LRT coverage into Vancouver, Washington. It finds that the South/North Project, including the Columbia River Crossing Project, provides improved reliability over the No-Build Alternative. Factors that affect reliability include the amount of reserved right-of-way, percent of protected trunk-line intersections and percent of passengers on exclusive transit right-of-way.

The Council finds that the Columbia River Crossing Project will result in improved peak-hour in-vehicle and total weighted travel times between Portland and Vancouver, Washington compared to the No-Build Alternative. It will increase transit trips within the South/North Corridor and increase the transit mode split for peak-hour radial trips.

Moreover, compared to an expanded all-bus system, the Council finds that the Columbia River Crossing Project will

- Increase transit trip production in the Project Transit Corridor by 150 percent compared to existing conditions by the year 2030;
- Increase weekday transit ridership into on the Interstate Max Yellow Line by 21,400 trips (150 percent) compared to the No-Build Alternative;

[11]This Steering Committee was assembled under requirements of federal law. It differs from the LUFO Steering Committee assembled to comply with House Bill 3478.

- Double the number of transit passenger trips over the I-5 Columbia River crossing, compared to the 2030 No Build alternative
- Decrease rush-hour transit travel times between Pioneer Courthouse Square and Clark College in Vancouver by 28 minutes compared to the No Build alternative; and
- Increase the percent of transit trips between the project corridor and downtown Portland from 21% in 2005 to 39% in 2030.

Ensure Effective Transit System Operations. By locating the South/North light rail alignment on the downtown Portland transit mall, all alignment alternatives have allowed for easy transfers to other transit routes serving most of the metropolitan region. The Council believes that this improved transit access has enhanced transit ridership, and it so finds.

Maximize the Ability of Transit to Accommodate Growth in Travel Demand. In 1998 the Council determined that the South/North Project had the greatest ability to accommodate growth of the various DEIS alternatives studied. The Columbia River Crossing portion of the South/North Project would increase LRT place miles ("place miles" are transit vehicle capacity for each vehicle type multiplied by vehicle mile travelled) by 58% and would increase total bus and LRT place miles by over 2% compared to No-Build.

Minimize Traffic Congestion and Traffic Infiltration Through Neighbo In 1998 the Council determined that the South/North Project would help slow the rate of traffic congestion and related problems, compared to the No-Build Alternative. It would:

- Remove almost 133,000 vehicle miles of travel per average weekday from the corridor road system;
- Eliminate 16 lane-miles of congested roadways; and
- Avoid 4,500 hours of traffic delays each weekday (compared to the No-Build Alternative in the year 2015).

By slowing the rate of traffic congestion growth, avoiding delay, and reducing the number of vehicle miles of travel per average weekday as compared to the No-Build Alternative, the South/North Project will minimize traffic congestion. The Council found that the slowing of congestion and reductions in vehicle miles of travel also would reduce the amount of traffic infiltrating Portland and Clackamas County neighborhoods by causing fewer vehicles to be on the roads than would otherwise occur in the absence of light rail transit.

The Council now finds that with the Columbia River Crossing Project, in comparison with a No-Build Alternative and with the highway improvements that are included in the Project, will result in a 57 percent decrease northbound and a five percent decrease southbound in rush-hour automobile travel times between Columbia Boulevard in Portland and SR 500 in Vancouver. It also finds that the Project will reduce the duration of congestion from 15 hours per day in the No-Build to between 3.5 and 5.5 hours per day with the improvements being made for automobile, transit and truck travel.

Facilitate Efficient Land Use Patterns. The Council finds that light rail has influenced the quality of access to vacant developable and redevelopable parcels of land in the South/North Corridor. It finds that light rail transit throughout the South/North corridor has supported the region's growth management strategy and the urban growth boundary (UGB) by:

- Providing access to vacant and redevelopable infill properties;
- Providing transportation capacity to the Portland Central City that will enable the region's core to accommodate the expected high growth levels;
- Providing the high quality transit needed to make the Clackamas Regional Center and Milwaukie Regional Center function in accordance with the growth strategy;
- Establishing new station communities which can be developed as mixed-use areas; and
- Instituting a pattern of growth that conforms to the goals, objectives and policies of local land use and infrastructure plans.

The Council finds that the Columbia River Crossing Project will further facilitate efficient land use patterns by promoting denser, transit-oriented development on Hayden Island. This shift in land use patterns from the existing auto-oriented development is consistent with the Hayden Island Plan.

Balance the Efficiency and Environmental Sensitivity of the Engineering Design. Indicators of environmental sensitivity include displacements, noise and vibration impacts, parkland impacts, floodplain impacts, wetland impacts and historic and archaeological resources impacts. These impacts are addressed in other findings, set out below, addressing the relevant LCDC criteria applicable to this proposal. For the reasons stated in the findings addressing those other criteria, the Council concludes that the positive impacts of the Project outweigh the negative environmental impacts.

Social Equity Considerations. In addition to the LPS Steering Committee objectives listed above, the Council believes and finds that social equity considerations should be taken into account. When it adopted the initial South/North LUFO back in 1998, the Council found the percentage of minority populations in nearly one half of the neighborhoods in the South/North Corridor to be higher than the regional average of 8.6 percent. Nearly two-thirds of corridor neighborhoods have a percentage of low-income households that is higher than the regional average (1990 US Census). The Council also found that the South/North Project would serve both low-income and minority neighborhoods. The Council concluded that the South/North Project will not adversely affect low income or minority neighborhoods disproportionate to the benefits they will receive with improved transit access. Indeed, it found that the project will substantially benefit a much larger segment of the populations of these affected areas, including low-income, transportation-disadvantaged, minority and elderly populations, than are otherwise directly adversely affected by the project. The Council continues to abide by these findings.

Overall Conclusions Regarding Neighborhood Impacts (Transit)

In summary, the Council finds and concludes that the selection of the light rail route and the Hayden Island station, including their locations, within the area constituting the Columbia River Crossing project has included a balancing of:

- the need for light rail proximity and service to present or planned residential, employment and recreational areas that are capable of enhancing transit ridership;

- the likely contribution of light rail proximity and service to the development of an efficient and compact urban form; and

- the need to protect affected neighborhoods from identified adverse impacts.

The Council finds and concludes that the Columbia River Crossing portion of the South/North Project will enhance transit service to areas all along the South/North Corridor, with particular benefits to Hayden Island and Vancouver Washington. The Council finds and concludes that this Project will improve connections and mobility throughout the Portland metropolitan region, including to areas along the existing eastside and westside MAX light rail lines; that the presence of light rail transit north of the Expo Center into Vancouver, Washington will encourage and support new and efficient development, consistent with Region 2040 Growth Concepts, that will benefit the affected local communities and the region; and that the improved accessibility provided by extending the South/North Project, and its many benefits, north to Hayden Island and Vancouver, Washington, especially when compared with the No-Build Alternative, combined with available measures to mitigate adverse impacts created by the Project, result in a substantial net benefit to the affected local communities, the region, and the states of Oregon and Washington.

For the reasons stated herein, the Council finds that it has considered the adverse economic, social and traffic impacts of the Columbia River Crossing Project and balanced these impacts against the Project's benefits. It finds and concludes that the northern extension of the South/North light rail line to Hayden Island and Vancouver, Washington will make a significant positive contribution to the quality of life in the Portland region, through improved mobility, decreased congestion, improved air quality, reduced energy consumption, and decreased reliance on the automobile, which will benefit Oregonians now and well into the future. It further finds that light rail transit can, has, and will continue to stimulate and enhance development of an efficient and compact urban form in appropriate locations identified for such development. It also finds that with mitigation imposed as part of the NEPA process or during local permitting processes, most of the adverse consequences identified in these findings can be reduced or avoided. Potential mitigation measures are identified in findings.

Provide for associated highway improvements, balancing the need to improve the highway system with the need to protect affected neighborhoods from the identified adverse impacts.

The Columbia River Crossing Project includes a broad spectrum of highway improvements including new I-5 bridges across the Columbia River, widening of and interchange improvements along I-5, and improvements to highways accessing I-5, the Expo Center and Hayden Island. The Council finds that these highway improvements are in addition to other highway improvements that the Council previously approved for the South/North Project, including highway improvements in SW Portland, SE Portland and Milwaukie. All other street and highway changes, such as intersection modifications, installation of traffic signals, access changes, etc. are ancillary to light rail improvements or proposed as mitigation to address specific adverse impacts of the South/North Project, and are not classified as highway improvements.

The Council finds that the need to construct new I-5 bridges is the principal catalyst behind the Columbia River Crossing Project and that light rail transit is a fundamental component of the bridge project. It finds that the Columbia River Crossing Project is a combined transit/highway project that represents a consensus among affected local government officials. It finds that without the identified highway improvements, the light rail improvements would not and could not go forward independently and that without the rail component, the highway improvements would not independently be going forward. For this project to work, both components are required. Additionally, the Project will facilitate bicycle and pedestrian travel across the Columbia River, thereby being a truly multi-modal project. The Council further finds that the combining of rail and highway improvements is not unique to the region. Indeed, it finds that the Westside Corridor Project, which extended light rail transit from downtown Portland to downtown Hillsboro, was a combination rail and highway project that was approved through a series of LUFOs adopted in the early and mid-1990s.

The Council finds that construction of new I-5 bridges, including a southbound bridge carrying light rail transit and a northbound bridge accommodating bicycle and pedestrian traffic, is necessary to maintain and improve an adequate interstate highway system. It finds that I-5 is the principal arterial serving the west coast states of Oregon, Washington and California, and the principal facility serving the interstate movement of freight by truck travel in these states. It finds that the existing I-5 bridges are severely congested during peak travel hours and severely hindered by their need to close traffic for periods at a time to allow ships and boats to pass underneath. All of this impedes mobility and delays the timely and efficient movement of freight between Oregon and Washington.

The Council also finds that the other identified highway improvements are necessary to complement the I-5 improvements and allow for an efficient local transportation system and access to/from I-5, the Hayden Island LRT station, and residential, commercial and industrial areas in the project area.

The improvements at Victory Boulevard interchange would improve safety and lengthen short, substandard on- and off-ramps. All movements within the Marine Drive Interchange would be reconfigured to reduce congestion and improve safety for trucks and other motorists entering and exiting I-5. Trucks currently account for 8 to 10 percent of the daily vehicles that cross the I-5 bridges. At the Marine Drive Interchange, trucks account for greater than 20 percent of the daily vehicle composition. During the hour when the highest numbers of

trucks are using the Marine Drive Interchange (9-10 a.m.), trucks account for approximately 30 percent of vehicles in the interchange. So by virtue of the improvements, the proposed design for the Marine Drive Interchange improves truck mobility. The improvements would allow the movements with the highest volumes in the interchange to move freely without being impeded by stop signs or traffic signals.

All movements for the Hayden Island Interchange would be reconfigured. The new configuration would be a split tight diamond interchange. Ramps parallel to the highway would be built, lengthening the ramps and improving merging speeds. Improvements to Jantzen Drive and Hayden Island Drive would include additional through, left-turn, and right-turn lanes. A new local road, Tomahawk Island Drive, would travel east-west through the middle of Hayden Island and under the I-5 interchange, improving connectivity across I-5 on the island and improving access to and from the Hayden Island LRT station.

The Columbia River Crossing Project would also include local street improvements on the Oregon mainland, which would improve access between I-5 and local roads in the area. The project would build a local multimodal bridge that would provide access to and from Hayden Island and the Hayden Island station for vehicle traffic, bicycles and pedestrians separate from the I-5 mainline.

Many bicycle and pedestrian improvements are included in the Columbia River Crossing Project. These include new facilities such as the multi-use pathway across the Columbia River, street improvements around the rebuilt interchanges, and new facilities for bicyclists and pedestrians around the new light rail stations and park and rides.

The proposed Marine Drive Interchange area would be entirely grade-separated, with the local road network and multi-use paths running below the interchange. Pedestrian and bicycle improvements at the Marine Drive Interchange would include a multi-use path constructed from the Marine Drive Interchange, over Hayden Island and the Columbia River. The path would be a minimum of 16 feet wide between its barriers and would direct users with pavement markings and signage. Larger curves would provide improved sight distance and flow, and path components would meet ADA accessibility standards.

Sidewalks would be constructed on most reconstructed streets throughout the project area. To improve east-west connections on Hayden Island, a 6- to 8-foot-wide sidewalk would be provided along Jantzen Drive and Hayden Island Drive. A 6-foot minimum width sidewalk would be provided along Tomahawk Island Drive. Crosswalks would be provided at all intersections and would meet ADA accessibility standards. The island streets would also include 6-foot bicycle lanes wherever improvements are made. All of the improvements would facilitate access to the light rail system.

The new northbound bridge over the Columbia River would also accommodate a multi-use pathway under the highway deck. This path would be 16 to 20 feet wide, located within the superstructure above the bridge columns and below the bridge deck. The multi-use path would separate pedestrians and bicyclists from vehicle noise and avoid proximity to moving vehicles.

The Council finds that the local improvements summarized above would improve the flow of traffic in the I-5 corridor, would improve intersection performance on local intersections compared to No-Build and would improve bicycle and pedestrian mobility and safety.

The Council finds that the local multimodal bridge that provides local access to/from Hayden Island would benefit residents of the island, providing an alternate access to the island.

The Council finds that although there are adverse impacts associated with the highway improvements of the Project, many of the impacts can be sufficiently mitigated, as addressed in the NEPA documentation. The Council finds that the benefits of the Project including improved I-5 and local intersection performance, decreased congestion in the corridor, improved bicycle and pedestrian mobility and safety, and others as addressed in this document herein, outweigh the impacts and that the Columbia River Crossing Project would cause a net positive impact to residents.

Overall Conclusions Regarding Neighborhood Impacts (Highway)

Overall, the Council finds that these highway improvements, taken together, will have a positive impact on interstate and local travel and on interstate and local commerce. They will enhance nearby neighborhoods and improve opportunities for pedestrian, bicycle and vehicle circulation to and around the Expo Center, Jantzen Beach Center, Hayden Island and Vancouver, Washington. While the expansion of and modifications to the local highway network may result in some adverse impacts identified and discussed above, the Council believes and concludes that on balance, these highway improvements will be a substantial benefit to the City of Portland, the Metro region, the State of Oregon, and their residences and businesses, in terms of accessibility, mobility, improved movement of commerce, and improved bicycle and pedestrian transport. The Council concludes that the benefits of these improvements strongly outweigh the adverse impacts that are associated with them.

6.3.2 Criterion 4: Noise Impacts

> **"Identify adverse noise impacts and identify measures to reduce noise impacts which could be imposed as conditions of approval during the NEPA process or, if reasonable and necessary, by affected local governments during the permitting process."**

Noise is a form of vibration that causes pressure variations in elastic media such as air and water. The ear is sensitive to this pressure variation and perceives it as sound. The intensity of these pressure variations causes the ear to discern different levels of loudness, and these differences are measured in decibels, or dBs. Vibrations can also be carried through the ground, in which case they are described in terms of vibration velocity levels in dB referenced to one micro-inch per second. As with air or water borne vibrations, ground vibrations have a threshold of human perception. Because air and ground borne vibrations have similar properties and are measured in similar ways, the Council finds that vibration impacts are appropriately considered with noise impacts in these findings.

Noise and vibration impacts specific to the Expo Center/Hayden Island Segment are addressed in the following section. Noise and vibration impacts also are identified, along with corresponding mitigation measures, in the Noise and Vibration Technical Report (Noise Report).

Identification of Noise and Vibration Impacts in the Expo Center/Hayden Island Segment.

The guidelines and standards for analyzing and mitigating transit noise and vibrations are different from those used for analyzing and mitigation highway noise. For transit noise, the guidelines and standards are established by the FTA while for highway noise, the guidelines and standards are established by the FHWA and ODOT. Because of the different guidelines and standards, the noise and vibration impacts of the transit and highway improvements in the Expo Center/Hayden Island Segment are addressed separately.

Transit Noise and Vibration Impacts and Mitigation Options

The noise criteria in the FTA Guidance Manual are founded on well-documented research on community reaction to noise and are based on change in noise exposure using a sliding scale. The amount that a transit project is allowed to change the overall noise environment is reduced with increasing levels of existing noise.

The FTA Noise Impact Criteria groups noise sensitive land uses into the following three categories:

> *Category 1*: Buildings or parks where quiet is an essential element of their purpose.
>
> *Category 2:* Residences and buildings where people normally sleep. This includes residences, hospitals, and hotels where nighttime sensitivity is assumed to be of utmost importance.
>
> *Category 3:* Institutional land uses with primarily daytime and evening use. This category includes schools, libraries, churches, office buildings, and other commercial and industrial land uses.

There are two levels of impact included in the FTA transit noise criteria.

> *Severe Impact:* Severe noise impacts are considered "significant" as this term is used in NEPA and implementing regulations. Noise mitigation will normally be specified for severe impacts unless there is no practical method of mitigating the noise.
>
> *Impact:* In this range, often called a "moderate" impact, other project-specific factors must be considered to determine the magnitude of the impact and the need for mitigation. These other factors can include the predicted increase over existing noise levels, the types and number of noise-sensitive land uses affected, existing outdoor-indoor sound insulation, and the cost-effectiveness of mitigating noise to more acceptable levels.

Transit noise can take several forms. These include LRT-induced noise impacts resulting from changes to roads and to motor vehicle traffic volumes; wayside LRT noise impacts; LRT wheel squeal impacts; noise from ancillary LRT facilities; and LRT vibration impacts and mitigation.

LRT-induced road traffic noise is generally associated with park-and-ride lots. There are no new planned park-and-ride lots in the Expo Center/Hayden Island Segment. There are, however, numerous highway improvements proposed for this segment. Their noise impacts are addressed below.

Wayside LRT noise is modeled based on measurements of existing LRT systems, the length and speed of trains, rates of acceleration and deceleration, location of special trackwork, auxiliary equipment and other factors. Options generally available to mitigate wayside LRT noise impacts include sound walls, crossover relocation and reduced LRT speeds. Within the Expo Center/Hayden Island Segment, wayside LRT noise impacts floating homes within the North Portland Harbor. These noise impacts are addressed below

Wheel squeal noise is generated by train wheels as they traverse a curve. Whether wheel squeal occurs and how loud it is depends on many factors, including the material used to make the rail, the level of wheel/rail contact point lubrication, the sharpness of the curve, train speed and wheel profile. There are several locations in the South/North Corridor where track curvature is acute enough to create wheel squeal impacts. However, none of these are located within the Expo Center/Hayden Island segment.

Where wheel squeal noise is generated, the noise impacts can be reduced or eliminated using the following general techniques:

- Dampening the wheel or using resilient wheels;
- Lubricating the wheel surface that slides against the rail;
- Using track designed to dampen squeal on sharply curved sections of the alignment.

If any wheel squeal impacts remain following the use of these mitigation measures, the use of barriers near affected receivers could be considered.

Noise from ancillary facilities includes noise from crossing bells and electrical substations located adjacent to the LRT trackway and LRT switching gear and transformers. Substation noise can be mitigated by designing and building substations to meet federal noise criteria for transit system ancillary facilities. Noise levels less than 60 dBA, which is a level typical of many residential areas, is expected at one foot from the exterior substation wall. This noise level can be reduced by as much as 10 dBA through the use of enhanced substation housing where substations are located near sensitive receivers. No noise impacts from crossing bells or substations are expected in the Expo Center/Hayden Island segment.

LRT vibration impacts resonate from the wheel/rail interface and are influenced by wheel/rail roughness, transit vehicle suspension, train speed, track construction and the geologic strata underlying the track. Vibration from a passing light rail train moves through the geologic strata into building foundations, potentially causing the buildings to vibrate. Ground-borne vibration is of such a low level that there is almost no possibility of structural damage to buildings near the alignment. The main concern of ground-borne vibration is that it can be annoying to building occupants. The primary options available to mitigate vibration impacts include: incorporating state-of-the-art vehicle specifications; keeping special trackwork (such as crossovers) as far as possible from sensitive receptors; using either spring-loaded frogs in tie-and-ballast track sections or flange-bearing rail in paved track sections where special trackwork cannot be moved; and installing ballast masts (in tie-and-ballast sections) or

vibration isolation technology, such as “whisper rail,” “booted” track-type support systems or resilient supported rail (for paved track sections). Small speed reductions may be able to reduce impacts to acceptable levels in a few locations, provided the speed reductions do not affect service schedules. There are several locations in the South/North Corridor where LRT vibration impacts occur. However, none of these are located within the Expo Center/Hayden Island segment.

The FTA has developed impact criteria for acceptable levels of ground-borne vibration that would apply to the light rail component of the Project. Exhibit 2-3 of the Noise Report summarizes the FTA impact criteria for ground-borne vibration as it affects most buildings. Exhibit 2-8 shows the ground-borne vibration and noise impact criteria for special buildings such as concert halls, TV and recording studios, auditoriums and theaters.

Overall, noise levels in the Expo Center/Hayden Island Segment of the project area are currently dominated by motor vehicle traffic on I-5 and Portland International Airport aircraft. Existing noise levels in this area exceed traffic noise criteria for 96 noise-sensitive receptors. As discussed in the Noise Report, the first three banks of floating homes in the vicinity of the new light rail alignment would be relocated due to project construction, and therefore those homes were not analyzed for project-related noise impacts. Of the floating homes that will remain, analysis identified 8 floating homes where noise levels are predicted to meet or exceed the moderate FTA noise impact criteria. The impacts occur at the row of homes nearest the future tracks, where light rail operations are predicted to produce a noise level of 61 dBA Ldn, which just meets the 61 dBA Ldn impact criteria. Noise from future light rail operations is well below the traffic noise levels at all other noise sensitive properties in the Expo Center/Hayden Island Segment, including the manufactured home residential area along the Columbia River.

Potential mitigation measures evaluated for reducing noise impacts from light rail for the project include 1) sound barriers, 2) track lubrication at curves, 3) special trackwork at crossovers and turnouts, 4) reduced train speed, and 5) building sound insulation. No light rail vibration impacts requiring mitigation were identified in the Expo Center/Hayden Island Segment. The eight light rail noise impacts at the floating homes would be best mitigated with the installation of sound barriers along the elevated light rail structure. A 3- to 4-foot acoustical absorbent sound wall or 6-foot reflective sound wall would be effective at reducing noise levels at these homes by 7 to 10 dBA.

Traffic Noise Impacts and Mitigation Options

Traffic and construction noise analyses are required by law for federal projects that 1) involve construction of a new highway, 2) substantially change the horizontal or vertical alignment, or 3) increase the number of through traffic lanes on an existing highway. Oregon policies also require the review and consideration of noise abatement on projects that substantially alter the ground contours surrounding a state highway.

FHWA and ODOT impact criteria for noise studies depend on existing land use or planned and permitted future land use. Existing land uses in the Expo Center/Hayden Island Segment include commercial, industrial, park/open space and residential. Most of the land uses near the LRT and highway improvements are commercial/industrial and park/open space. There is a large group of floating homes located along the southern edge of Hayden Island on both sides of I-5. Other residential land uses include the Red Lion Jantzen Beach Hotel, the Oxford

Suites, and the Courtyard by Marriott. There is also a large group of single and multi-family residential units east of I-5 along N Hayden Drive and N Tomahawk Drive.

As described in the discussion of transit noise impacts above, existing noise levels in the project corridor were modeled and noise levels currently exceed FHWA and ODOT traffic noise criteria for 96 noise-sensitive receptors located in the Expo Center/Hayden Island Segment. These receptors include floating homes, the south portion of Delta Park and at the Red Lion Columbia Center Hotel, which include all rooms facing toward I-5

The project includes removal of the floating homes closest to the I-5 crossing of the North Portland Harbor and the addition of 3.5 foot safety barriers along all sides of all elevated roadway structures. The combined effect of displacing noise sensitive properties nearest the project roadways, and the addition of the safety barriers, would result in no newly impacted noise-sensitive receptors in Expo Center/Hayden Island Segment. In addition, those receptors currently impacted will not experience substantial increases in the severity of those impacts.

Overall Conclusions Regarding Noise Impacts and Mitigation Options

Based on the information in the Noise Report, the Council finds and concludes that sound wall options are available and have been recommended to mitigate the identified light rail noise impacts in the Expo Center/Hayden Island Segment. Based also on information in the Noise Report, with the removal of some existing noise-sensitive receptors and the addition of safety walls, no new highway noise impacts are expected in the Expo Center/Hayden Island Segment. The final decision and recommendation to include the approved mitigation will be made during the final design process.

6.3.3 Criterion 5: Natural Hazards

> **"Identify affected landslide areas, areas of severe erosion potential, areas subject to earthquake damage and lands within the 100-year floodplain. Demonstrate that adverse impacts to persons or property can be reduced or mitigated through design or construction techniques which could be imposed during the NEPA process or, if reasonable and necessary, by local governments during the permitting process."**

Natural hazard impacts specific to the Expo Center/Hayden Island Segment are addressed in the following section. Natural hazard impacts, and associated mitigation measures, also are described in the Geology and Groundwater Technical Report (Geology Report) and the Water Quality and Hydrology Technical Report (Hydrology Report).

Overview of Natural Hazards Impacts in South/North Corridor and Mitigation Measures

The South/North Project, including the Columbia River Crossing portion, lies within the Portland Basin, a basin characterized by relatively low topographic relief with areas of buttes and valleys containing steep slopes. Much of the overall South/North Project alignment crosses developed land. Long-term impacts to the geologic environment consist of relatively minor changes in topography and drainage patterns, minor settlement of near-surface

materials, and potential changes in slope stability and erosion. These impacts could occur as a result of excavation, placement of structures and fills and clearing and grading.

The geology and soils in the area of the South/North Project are typical of the Portland Basin. Soils within the South/North Corridor developed on flood and alluvial deposits. Where undisturbed, they are generally sandy to clayey loam and are well to poorly drained. However, much of the area is classified as urban land, where the original soils have been extensively modified or covered. Associated with the channel deposits, areas of highly organic silt and clay and deposits of peat may be encountered and require special construction techniques. Expansive (high shrink-swell) soils are present in the corridor.

The potential for major landslides within the South/North Corridor is very limited because the topography within the corridor is relatively gentle, and the geologic conditions are generally favorable.

The Pacific Northwest is a seismically active area and subject to earthquakes. Oregon has the potential for three types of earthquakes: crustal, intraplate and subduction zone. Although earthquake prediction is an inexact science, it is reasonable to assume that earthquakes will occur in Oregon.

Studies of relative earthquake hazards have been completed for much of the Portland area. These studies show that much of the South/North corridor lies in areas with relatively high potential for earthquake damage. Project design and estimated construction costs reflect the need to conform to the relevant seismic standards for capital construction.

To mitigate earthquake hazards, TriMet and ODOT will adhere to applicable Federal, State and local building codes or standards for bridges and structures in the South/North Project.

Groundwater may be encountered at shallow depths along sections of the corridor that cross the flood plains of rivers and creeks. Other areas of shallow groundwater levels may exist locally, controlled by local variations in soil type and drainage.

Additionally, the study area intersects major rivers, minor water courses and floodplains within the lower Columbia and Willamette River basins. Floodplains are valuable natural resource areas providing fish and wildlife habitat, flood control, stormwater storage, water quality enhancement, sediment and erosion control, and educational, recreational, research, and aesthetic uses. Executive Order 11988 directs federal agencies to conduct their activities in ways designed to reduce the risk of flood loss; to minimize the impact of floods on human safety, health, and welfare; and to restore and preserve the natural and beneficial values served by floodplains.

Natural Hazard Impacts within the Expo Center/Hayden Island Segment

As shown in Exhibit 3-12 of the Geology Report, no specific *landslide areas* or steep slopes (greater than 25 percent) are identified in the Expo Center/Hayden Island Segment. As noted above, the potential for major landslides within the South/North Corridor is very limited

because the topography within the corridor is relatively gentle. Although the LRT and highway improvements will cross the North Portland Harbor and the Columbia River on new bridge structures, the banks associated with the crossings are not particularly steep. As shown in Exhibit 3-4 of the Geology Report, the mapped surface unit for the bridge footprints is Quaternary alluvium and fill. In addition, historic aerial photographs for the area indicate that construction of North Portland Harbor and Columbia River bridge foundations and abutments would likely encounter fill embankments at Hayden Island. However, because steep slopes and landslides have not been identified near the proposed bridge footprints, no long-term adverse effects due to steep slopes or landslides are anticipated.

Exhibit 3-5 of the Geology Report identifies soil types within the greater Expo Center/Hayden Island Segment area, and Exhibit 3-6 describes the erosion hazard ratings for these soil types. As shown in Exhibit 3-5, the project footprint extends to areas with three soil types – Pilchuck-Urban land complex (0 to 3 percent slope); Sauvie-Rafton-Urban land complex (0 to 3 percent); and Rafton silt loam, protected. These soil types are not considered to have *severe erosion potential*.

As stated above, the Pacific Northwest is a seismically active area and is subject to *earthquake damage.* Bridges are vital links in the transportation system and are often especially vulnerable during seismic events. The Geology Report does not identify any seismically active earthquake faults in the Expo Center/Hayden Island Segment. However, several types of earthquakes could occur in the project area. In particular, there is a large, offshore fault located in the Pacific Ocean west of the I-5 crossing. Exhibit 3-16 of the Geology Report shows a map of the relative earthquake hazard ratings in the project area. These ratings take into account a variety of potential earthquake effects, with Zone A being the most hazardous areas and Zone D being the least hazardous. Earthquake effects include ground motion amplification, slope instability, and soil liquefaction, all of which have a high potential to impact public safety and cause structural damage and economic disruption. The Expo Center/Hayden Island Segment is identified in relative earthquake hazard Zones A and B.

The Hydrology Report includes background information on hydrology and floodplains in the CRC project corridor. The I-5 bridges are located at river mile 106 of the Columbia River. The Columbia River is highly constrained within the project area by existing levees and landform. In addition, 10 bridge footings are currently located below the river's ordinary high water level (OHW), and also constrict the river. The North Portland Harbor is a large channel of the Columbia River located between North Portland and the southern bank of Hayden Island. A flood control levee runs along the south bank of the North Portland Harbor and forms a boundary between the adjacent neighborhoods and the harbor.

The installation of piers within the Columbia River and North Portland Harbor would encroach upon the Columbia River's *100-year floodplain*. However, this would result in little, if any, increase in flooding risks, given the relatively small size of the bridge piers compared to the size of the Columbia River. The LRT and highway improvements in the Expo Center/Hayden Island Segment would either avoid or be elevated above the floodplain, with no significant encroachment or fill that would cause adverse flooding conditions or changes in

flood velocity. The volume of displacement presented by the piers is expected to be insignificant.

Mitigation Options for Natural Hazard Impacts in the Expo Center/Hayden Island Segments

Based on the information contained in the Geology Report, the Council finds that no *landslide areas* or *areas of severe erosion potential* have been identified in the Expo Center/Hayden Island Segment. While historical evidence of seismic activity in Oregon is minimal, recent studies indicate that western Oregon may be subject to a greater risk from *earthquake hazards* than previously thought. Site geology has a significant impact on earthquake damage. Young unconsolidated silt, sand, and clay deposits are associated with enhanced earthquake damage through amplification of shaking, settlement, liquefaction, and landsliding.

Potential mitigation measures to address geologic/soils conditions are provided in the Geology Report. During final engineering stage of the project, site-specific assessments would include additional geotechnical testing and monitoring. Soft foundation conditions, delineated by the exploration program, can be mitigated with proper designs. The site-specific assessments will also assess the use of soil stabilization techniques to minimize liquefaction of soils. Stabilization techniques include the use of compaction grouting, stone columns, and other techniques.

Mitigation measures would also apply to project structures. The project will provide seismic upgrades to existing structures, as-needed, and new and upgraded structures will adhere to the following applicable building codes and standards:

- AASHTO LRFD Bridge Design Specifications
- AASHTO Guide Specifications for LRFD Seismic Bridge Design
- WSDOT Bridge Design Manual, LRFD M 23-50 (BDM)
- ODOT Bridge Design and Drafting Manual (BDDM)
- City of Vancouver Municipal Code (VMC) Chapter 20.740.130 Critical Areas Protection- Geologic Hazards Areas

The project will use elements such as drilled shafts, driven piles, abutments and retaining walls. Structural designs will take into consideration stormwater infiltration or other future changed conditions near shallow footings, retaining walls and/or other structures that could increase the potential for soil liquefaction during a future seismic event.
Based on the facts in the Geology Report, the Council finds that long-term impacts to geology and soils in the Expo Center/Hayden Island Segment are minor and can be mitigated. Mitigation could consist of using standard engineering practices to construct stable slopes; design of bridges to meet Uniform Building Code seismic standards; and techniques such as excavation and backfilling, special footing and foundation designs, and special construction techniques such as surcharging and dewatering to address the stability of artificial fill and the high water table on Hayden Island. Additionally, the Columbia River Crossing Project would replace existing bridges with new and retrofitted structures built to modern seismic safety standards, and would stabilize weak soils along the Columbia River on Hayden Island and

around Marine Drive. The Council concludes that the proposed LRT and highway improvements would significantly improve public safety and structure stability during earthquake seismic events when compared with existing conditions.

The North Portland Harbor and the Columbia River will span the 100-year *floodplain*, but with no significant fill or encroachment into the floodplain resulting from pier placement. A minor amount of fill will be associated with the placement of piers for the new bridges. However, the Council finds that floodplain impacts, if any, would be very small given the relatively small size of the bridge piers in comparison to the Columbia River. A flood-rise analysis will be conducted during the final design to calculate the impact that piers in the water will have on flood elevation, in accordance with local regulations and Executive Order 11988 – Floodplain Management. If flood-rise exceeds the allowable limit, the rise would be mitigated through floodplain excavation (cut/fill balance) activities, and the Council finds that such mitigation is feasible

6.3.4 Criterion 6: Natural Resource Impacts

> **"Identify adverse impacts on significant fish and wildlife, scenic and open space, riparian, wetland and park and recreational areas, including the Willamette River Greenway, that are protected in acknowledged local comprehensive plans. Where adverse impacts cannot practicably be avoided, encourage the conservation of natural resources by demonstrating that there are measures to reduce or mitigate impacts which could be imposed as conditions of approval during the NEPA process or, if reasonable and necessary, by local governments during the permitting process."**

Natural resource impacts specific to the Expo Center/Hayden Island Segment are addressed in the following section. Natural resource impacts, along with associated mitigation measures, also are described in the Ecosystems Technical Report (Ecosystems Report), the Wetlands Technical Report (Wetlands Report), the Parks and Recreation Technical Report (Parks Report) and the Visual and Aesthetics Technical Report (Visual Report).

Identification of Impacts to Significant, Protected Natural Resources in the Expo Center/Hayden Island Segment

Criterion 6 of this Land Use Final Order requires identification of adverse impacts on *significant* resources (fish and wildlife, scenic and open space, riparian, wetland and park and recreational areas, including the Willamette River Greenway) that are *protected* in acknowledged local comprehensive plans. Oregon planning under Statewide Planning Goal 5 calls for inventories and protection of significant natural resources including fish and wildlife habitat, wetlands, riparian and scenic and open space areas. Because not all natural resource sites within the project area are identified as significant by local governments in their comprehensive plans, the scope of analysis of natural resource impacts under Criterion 6 is

generally narrower than the scope of analysis contained in the federal environmental impact statements.

For the Columbia River Crossing portion of the South/North Project, the relevant acknowledged comprehensive plan is the City of Portland Comprehensive Plan. That plan includes policies and objectives to address conservation of a range of natural resources identified in Statewide Goal 5, including wetlands, riparian areas and water bodies, fish and wildlife habitat, scenic routes and viewpoints, and significant upland areas. The City has completed an inventory and analysis of natural resource sites, identified the significance of each resource site and provided varying levels of protection to specific sites through the application of Environmental Overlay zones (E-zones). The city applies two environmental overlay zones: environmental protection (ep) and environmental conservation (ec). The *environmental protection zone* provides the highest level of protection for resource areas deemed highly valuable through a detailed inventory and economic, social, environmental, and energy (ESEE) analysis. Development is largely prevented in these areas. The *environmental conservation zone* areas are also considered valuable, but can be protected while allowing "environmentally sensitive urban development."

Within the Expo Center/Hayden Island Segment, the Council finds that the environmental conservation zone applies to the Columbia River, North Portland Harbor, Columbia Slough, and the Vanport Wetlands to identify and protect these areas for multiple resource values, including *fish and wildlife habitat, riparian corridors, open space and scenic and wetland areas.* However, the E-zone regulations are superseded by the regulations of Peninsula Drainage District #1 at the Vanport Wetlands. As identified in the Ecosystems Report, about 41 acres within the project's footprint in the Expo Center/Hayden Island Segment are within Portland's E-zones, and impacts to these resources are regulated.

The Council also finds that N Marine Drive is identified as a *scenic corridor* in the Portland Comprehensive Plan and the Columbia Slough has been defined as a *scenic waterway* by the City of Portland, and could be considered a recreational resource. Further, the Portland Comprehensive Plan designates the planned extension of the 40-Mile Loop *recreational trail* along N Marine Drive adjacent to the south side of the North Portland Harbor. Additionally, the Portland Comprehensive Plan designates lands within the Expo Center/Hayden Island Segment as *Open Space.* This designation provides for the enhancement and preservation of public and privately owned open, natural, and improved parks and recreational areas. Designated Open Space is found on the east side of I-5 between N Martin Luther King Jr. Boulevard and N Hayden Meadows Drive (Delta Park), and on the west side near the Expo Center exit. The Open Space designation also borders the N Columbia Boulevard interchange at the southern end of the area of primary impact. Based on these facts, the Council concludes that the natural resources highlighted above are significant and afforded some protection under the acknowledged Portland Comprehensive Plan.

Fish and Wildlife Habitat. The Columbia River and North Portland Harbor are major aquatic resources in the Expo Center/Hayden Island Segment and are recognized as significant natural resources for multiple values, including *fish and wildlife habitat.* Shorelines along both of these waterways have been substantially altered and now support

limited natural vegetation. These aquatic resources could be directly affected by one or more of the following activities: 1) in-water construction work, 2) construction in or near riparian areas, 3) re-routing of stormwater drainage from roadways and bridges, and 4) permanent structures placed in or removed from waterways.

Historically, the project area was forested, with forested wetlands along the Oregon shoreline and on Hayden Island. The Oregon shoreline was part of a large floodplain wetland system and included many sloughs, back channels, and small or seasonal lakes. Urban development has substantially degraded historic habitat in all parts of the project area, particularly for land-based species. Exhibit 3-10 of the Ecosystems Report shows the amount of different habitat types within the project area. The largest area is comprised of open water, as this classification includes the portions of the Columbia River, North Portland Harbor and Columbia Slough within the project area, and stretches up and downstream from the existing I-5 bridges to account for hydroacoustic attenuation areas. Outside of open water, the project area is almost exclusively occupied by urban habitats. Less than2 percent of the project area is classified as either wetland or forest habitat, with most of this occurring as small patches isolated from other natural areas.

As described in the Ecosystems Report, the Columbia River and its tributaries are the dominant aquatic system in the Pacific Northwest. In the project area, river height and flow rate are influenced by tides and upstream dams. Because the project is within a heavily developed area, riparian habitat quality along the banks of the Columbia River is poor. Dikes and levees, particularly when reinforced with riprap or concrete, as is the case near the I-5 bridges, make poor quality riparian habitat. The river in this area offers pool and glide habitats for fish, though the water quality is limited for several pollutants. The I-5 bridges influence aquatic habitat conditions in the main channel and North Portland Harbor. Bridge piers in the river provide potential refuge from the current for both predatory fish and juvenile salmon.

The North Portland Harbor channel, on the south side of Hayden Island, supports several floating home communities and commercial and recreational moorages. Average depth in this channel is about 14 feet, with deeper water on the south side. The south shore supports active industrial uses. Piers and moorages line the shore, providing very low quality riparian habitat. Piers and floating homes provide shade and refuge for both predatory fish and juvenile salmon. With the exception of a few large cottonwoods along both shores of the harbor, ornamental plantings and weedy exotic species comprise most of the vegetative cover. Only the open water of the river, and to a lesser extent the harbor, provides much habitat value to wildlife. A variety of resident and migratory waterfowl are expected on both waterways, as are small mammals such as nutria and river otter.

The Ecosystems Report contains detailed information on the status of protected species in the project corridor. Bald eagles use the Columbia River and environs to forage for fish and waterfowl, but no nesting or breeding sites are known within one mile of the project. Bald eagles were removed from the federal ESA list in August 2007, but are still listed as threatened under Oregon and Washington ESAs.

Peregrine falcons are known to be present in the project area, and utilize the existing I-5 bridge structures year-round. This species was removed from the federal ESA list in 1999 and from the Oregon ESA list in March 2007.

The project area is located in the Pacific flyway, the major north-south route for migratory birds that extends from Patagonia to Alaska. Many migratory birds use the area for resting, feeding, and breeding.

The Columbia River is an important passageway for anadromous fish species moving between the ocean and upstream spawning areas, and also provides significant habitat for resident fish species. The Columbia River and North Portland Harbor are known to support listed anadromous salmonids, including Chinook salmon, chum salmon, sockeye salmon, steelhead trout, and coho salmon, which use this habitat primarily for migration, holding, and rearing. Exhibit 3.9 of the Ecosystems Report summarizes the protected aquatic species known to use or potentially be using waterways in the project area.

The Council finds that the existing I-5 highway, bridges, and interchanges are located in a highly urbanized area. The combined effect of existing transportation facilities and development patterns results in adverse impacts to aquatic, riparian, and terrestrial habitats and the species that rely on them for survival. Existing fish and wildlife habitat impacts include the following: 1) Untreated stormwater runoff has degraded water quality, 2) Columbia River bridge piers provide a refuge for fish species that prey on juvenile salmon, and 3) the bridge and roadway alignment travels through locally and regionally designated habitats.

In general, the Council finds that the long-term effects to aquatic habitat would be consistent with current conditions with the continued presence of bridge piers in the Columbia River and a major transportation structure over the river. Compared with the No-Build Alternative, the Project has fewer bridge piers; however, the piers will be bigger than those currently in place, casting larger shadows and displacing some shallow water habitat.

The Council finds that effects to riparian habitat will be negligible in the Columbia River and North Portland Harbor, as there is very little functioning riparian vegetation in the main project area. About 35 acres within Portland's E-zones would be directly impacted by light rail and highway improvements in the Expo Center/Hayden Island Segment. However, the additional acreage impacted should not adversely affect the overall function of terrestrial and riparian habitat or the long-term sustainability of plant and animal species in the project area. The project improvements will mostly be constructed within existing rights-of-way or land already developed to urban densities, areas that generally provide poor quality fish and wildlife habitat. The project will revegetate disturbed shoreline areas, minimizing long-term effects to Columbia River riparian habitat. There will be no excavation or removal of trees from the Columbia Slough riparian area. Therefore, the project will have no effect on Columbia Slough riparian habitat.

Scenic and Open Space Areas. *Scenic and open space* resources recognized in the City of Portland's *Scenic Views, Sites and Drives Inventory, Scenic Resource Protection Plan* include

the Marine Drive scenic corridor, the North Portland Harbor scenic corridor, the historic northbound I-5 truss and lift bridge, and the Columbia River scenic corridor. Additionally, the Columbia Slough has been defined as a scenic waterway by the City of Portland and could be considered a recreational resource.

The Council recognizes that highways and major transit facilities are highly visible public facilities that can noticeably affect the visual character of surrounding landscapes and the perception of visual resources. Such changes can be of keen interest to local residents and jurisdictions as well as to travelers using the facilities.

The Visual Report describes existing conditions and long-term effects to the viewsheds in the project corridor. A viewshed, or "landscape unit", is the portion of the landscape that can be seen from within the project area and that has views of the project area. The boundaries of a viewshed are determined by the surrounding topography, vegetation, and built environment. Two viewsheds are described for the Expo Center/Hayden Island Segment: 1) the Columbia Slough landscape unit, and 2) the Columbia River landscape unit.

Mixed industrial-commercial development, sports fields, and marinas define the visual character of the Columbia Slough landscape unit. Visual resources include the Columbia Slough Scenic Corridor, stands of mature trees, Vanport Wetlands (west of I-5), and views of the Tualatin Hills, Mount St. Helens, and the Washington Cascades. Viewer sensitivity in the Columbia Slough landscape unit is low for drivers and high for recreational users.

The river defines the visual character of the Columbia River landscape unit. Visual resources include the Columbia River and its shoreline and views of Mt. Hood and the Tualatin Hills. Viewer sensitivity and vividness in the Columbia River landscape unit is high.

The primary elements of the Columbia River Crossing Project that would affect visual quality and character are the new bridge structures across the North Portland Harbor and the Columbia River. The Council finds that the visual effects in the Columbia Slough scenic corridor would be minor.

Visual impacts to the N Marine Drive and Columbia River scenic corridors would occur from:

- The greater heights and widths of the new structures across the Columbia River;
- The widening of the I-5 corridor due to the addition of auxiliary lanes along I-5;
- The new light rail/vehicular/bicycle/pedestrian bridge between Hayden Island and Expo Center Drive; and
- The wider or higher ramps for reconfigured interchanges at Marine Drive and Hayden Island.

This section of the N Marine Drive Scenic Corridor borders the North Portland Harbor, a narrow waterway dominated on the east by the large horizontal forms of I-5 and heavy industrial activities and busy roads along its south banks. Older, wooden and metal storage and other buildings rim the bank. Views from the south and north bank of the Harbor are blocked to the east by the I-5 bridge but focus on a cluster of small docks and houseboats

nestled against the south shore of Hayden Island adjacent to the bridge. Views west down the harbor focus on the channel and on river-related commercial and industrial activities along both banks.

The new light rail/vehicular/bicycle/pedestrian bridge will cross under N Marine Drive and over the North Portland Harbor on an approximately 1000 foot structure constructed west of the existing I-5 bridge over the harbor. The LRT bridge would remove some houseboats and vegetation along both banks of the harbor. The bridge would also introduce a new overhead structure over the Marine Drive and North Portland Harbor scenic corridors. However, because the multi-modal bridge will closely parallel the existing I-5 bridge and is located in an intensively urban, industrial section of the scenic corridor, the Council finds that the project will not result in a significant adverse impact on either scenic corridor.

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The reach of the Columbia River crossed by the I-5 bridges is flat, open water bordered by industrial, commercial, residential and undeveloped areas along its shoreline. The river is a significant regional resource and the dominant visual element within this segment because of its large scale and openness. The river also serves as a dramatic gateway between Oregon and Washington. The Visual Report concludes that the new bridge forms over the Columbia River and the resulting changes to views of (and from) the Columbia River would be mostly positive. Potential impacts would include:

- Removal of the visually complicated truss structures and lift towers of the existing I-5 bridges. This action would remove an obstruction of views from the higher deck and from the river. However, this action would remove an important contributor to the area's historic context (the I-5 bridges) and a character-defining aspect of interstate travel.
- From I-5, views of the Portland and Vancouver skylines, distant shorelines, rolling hills, and mountain profiles would generally improve. Toward I-5, views of open water and shorelines from shoreline-level and elevated viewpoints would also generally improve.

The Council finds that high-quality design and construction of the proposed transit and highway facilities will be important mitigation tools for visual quality and aesthetics associated with designated scenic and open space resources. The City of Portland and other stakeholders will continue to discuss the aesthetic attributes of the new bridge structures to best mitigate potential visual impacts and to create a noteworthy visual feature. The Council understands that design guidelines have been developed and will be used during the final design phases of the project to guide decisions that impact visual character and quality. It considers the design of the I-5 bridges to be a substantial visual mitigation opportunity for the project. Appropriate conditions that are reasonable and necessary and do not prevent implementation of the LUFO can be imposed through the local review process to avoid or mitigate adverse impacts on designated scenic resources and viewpoints.

Riparian Areas. As described in the discussion of fish & wildlife habitat, the *riparian area* along the North Portland Harbor and the Columbia River has been significantly altered with development. Shorelines along both of these waterways now support limited natural

vegetation. The project improvements will mostly be constructed within existing rights-of-way or on land already developed to urban densities, areas that generally provide poor quality fish and wildlife habitat. The project will revegetate disturbed shoreline areas, minimizing long-term effects to Columbia River riparian habitat. There will be no excavation or removal of trees from the Columbia Slough riparian area. Therefore, the project will have no adverse effect on Columbia Slough riparian habitat.

Wetland Areas. The Wetlands Report notes that there are large wetland systems east and west of the immediate project area in the Expo Center/Hayden Island Segment, including the Vanport Wetland, Force Lake, Smith and Bybee Lakes, and West Hayden Island wetlands. Additionally, the Columbia Slough watershed has substantial wetlands and other water present within the urban matrix. Exhibit 3.6 identifies the following field-identified wetlands in the Expo Center/Hayden Island Segment: 1) Victory interchange wetlands, 2) Schmeer Slough, 3) Walker Slough, 4) Expo Road wetland, and 5) Vanport Wetlands. The wetland delineation report was submitted for concurrence to the Oregon Department of State Lands (DSL) in 2008 and DSL has concurred with the delineation (#WD 2008-0205). In addition to field-identified wetlands, a potentially jurisdictional water area is also identified in Exhibit 3-6 of the Wetlands Report (PJWA O). The CRC project has the possibility of encroaching upon the eastern edge of PJWA O, however, lacking permission from the property owner to enter the Vancouver Way property, neither the project team nor regulatory agencies can confirm the presence or absence of jurisdictional wetlands at this location.

Based on information in the Wetlands Report, the Council finds that the project footprint would not encroach upon any identified wetlands in the Expo Center/Hayden Island Segment. The new impervious surface will not discharge untreated stormwater runoff into the wetlands and the wildlife activities that may be impacted are already negatively affected by the urbanized environment.

Park and Recreational Areas and Willamette River Greenway. Designated *park and recreational areas* close to the proposed LRT and highway improvements in the Expo Center/Hayden Island Segment include East Delta Park, the Marine Drive Multi-Use Trail and the proposed Bridgeton Multi-Use Trail. The project improvements are located outside of the boundaries of the *Willamette River Greenway.*

East Delta Park is a regional park located east of I-5 between N Denver and Martin Luther King Jr. Boulevard. East Delta Park encompasses about 85 acres and facilities include softball and soccer fields, control line flying field, sand volleyball courts, playground, and off-leash dog area on ODOT property. Approximately 0.4 acre of off-leash area associated with East Delta Park, but located in ODOT right-of-way, would be permanently acquired for the project improvements.

The Marine Drive Multi-use trail is a designated *recreational trail* along N Marine Drive. The five-mile segment extending from I-5 west to Kelley Point Park connects to the Marine Drive interchange and North Portland Harbor bridges. The 40-Mile Loop is designated a significant recreational resource and is protected in the acknowledged City of Portland Comprehensive Plan. Project improvements in the Expo Center/Hayden Island Segment would not require any

use of the trail. Based on information included in the Parks and Recreation Report, the Council finds that improvements to the bicycle and pedestrian facilities would represent a large improvement over the circuitous paths that exist today within the loops and ramps of the Marine Drive interchange. New, wide multi-use paths beneath the Marine Drive interchange would connect both sides of I-5 to the Expo Center light rail station, East Delta Park, the Marine Drive Multi-use Trail, and the crossing over North Portland Harbor to Hayden Island. Additionally, the Council finds that the new improvements to bicycle and pedestrian facilities within the Marine Drive interchange area could be connected to the proposed Bridgeton Trail sometime in the future.

Mitigation Options for Natural Resource Impacts in the Expo Center/Hayden Island Segments

The Council finds that the South/North Project will have no adverse impacts on park areas and designated recreational trails, riparian areas and identified wetland areas. Pedestrian and bicycle improvements in the vicinity of the Marine Drive interchange will substantially improve connections to the Marine Drive multi-use recreational trail.

The Council finds that the bridges across the North Portland Harbor will have an impact on the scenic and visual character of this segment. However, by locating the LRT bridges in close proximity to the existing and more dominant I-5 bridges, the Council concludes that visual impacts will be reduced. Additionally, by locating the LRT alignment to the west of I-5, views up the Columbia River from the I-5 bridges toward Mt. Hood are not affected.

Construction of the new LRT and highway bridges over the North Portland Harbor and the Columbia River could result in adverse impacts to wildlife habitat. Impacts to riparian habitat along North Portland Harbor would be limited to the loss of several relatively large cottonwood trees along the harbor shorelines. Since these trees occur in small, isolated stands surrounded by development, their loss would not adversely affect wildlife populations. Small, isolated stands of trees in an urbanized area afford relatively poor quality habitat due primarily to the lack of habitat diversity, lack of buffering from human activity and lack of movement corridors to other habitat areas.

Long-term impacts to fisheries include the removal of a small amount of channel bottom habitat due to construction of the bridge pier foundations. None of the bridge piers is expected to adversely modify critical habitat; however, elements such as cover, shelter, refuge, holding, or rearing might be adversely affected to a relatively small extent. No suitable spawning habitat, and limited rearing and holding habitat for juvenile salmonids, is present in the area of the bridge crossings. As a result of the analysis and findings presented in the *Biological Assessment for Threatened, Endangered, and Candidate Fish* and the approved Biological Opinion, the Council concludes that, with implementation of a number of conservation measures, the South/North Project would not likely jeopardize populations of threatened or endangered fish species or adversely modify their critical habitat in the project area. However, due to the extent of in-water work and the presence of many ESA-listed fish, it is acknowledged that adverse effects to individual fish and their critical habitat are likely to occur, but effects are avoided or minimized to the extent practicable. The Council notes that NMFS produced this finding in their Biological Opinion.

The Council finds that the following mitigation measures outlined for Threatened, Endangered, and Candidate Fish in the Expo Center/Hayden Island Segment are available to mitigate adverse impacts to the North Portland Harbor and the Columbia River and could be imposed as conditions of approval during the FEIS process and/or the local permitting process if reasonable and necessary:

- Implement erosion and sediment control measures to prevent sediment from entering surface waters.
- Time in-water construction activities based on discussions with NMFS and the Oregon Department of Fish and Wildlife, and take into consideration factors such as timing of fish migration and construction schedule and cost.
- Use of hydroacoustic attenuation measures to reduce impacts on the behavior of fish and sea lions.
- Conduct sediment sampling prior to construction of in-water bridge piers in order to determine the presence of and characterize potential contaminants.
- Limit the operation of equipment in the active river channel to the minimum necessary.
- Clean all equipment that is used for in-water work prior to entering the water.
- Do not store or transfer petroleum products within 150 feet of the active river channel, unless isolated within a hard zone with suitable containment measures in place.
- Assure the development and implementation of plans for the safe storage and containment of all hazardous materials used in project construction.
- Include measures in the plan for containment berms and/or detention basins, where appropriate.
- Develop a site-specific sediment control and erosion control plan prior to project implementation.

The Council finds that these types of measures could be imposed as conditions of approval during the NEPA process or, if reasonable and necessary, by local governments during the local permitting process.

6.3.5 Criterion 7: Stormwater Runoff

> **"Identify adverse impacts associated with stormwater runoff. Demonstrate that there are measures to provide adequate stormwater drainage retention or removal and protect water quality which could be imposed as conditions of approval during the NEPA process or, if reasonable and necessary, by local governments during the permitting process."**

Stormwater runoff impacts specific to the Expo Center/Hayden Island Segment are addressed in the following section. Stormwater impacts and mitigation measures are also described in the Water Quality and Hydrology Technical Report.

General Overview of Stormwater Runoff Impacts and Mitigation

The South/North Project intersects major rivers, minor water courses and floodplains within the lower Columbia and Willamette River basins, including the Willamette and Columbia Rivers. Existing waterways in the South/North Project area receive large volumes of stormwater and surface runoff containing a variety of pollutants, including chemicals and nutrients from fertilizers and pesticides, roadway sediments, motor vehicles and other man-made or natural sources. Water quality in the corridor is typical of drainage basins with urban development.

Areas developed or under development increase the rate and volume of peak stormwater discharges. The peak runoff rate and volume of stormwater discharges usually increase when construction removes vegetation, compacts soils, and/or covers significant portions of a site with buildings or pavement. Typical problems associated with increases in peak discharge rates include higher flow velocities in streams, more erosion, and more frequent flooding. These problems degrade habitat areas, damage property, and require increased maintenance of culverts and stormwater facilities.

A range of federal laws, state statutes, and local and regional ordinances address hydrologic impacts from development. State and local regulations typically establish standards for controlling the peak rate of stormwater runoff. Regional standards, contained in Title 3 of Metro's *Urban Growth Management Functional Plan*, more broadly address flood mitigation, erosion and sediment control, and the protection of long term regional continuity and integrity of water quality and flood management areas. Federal National Flood Insurance Program criteria and Executive Order 11988 regulate development in flood prone and floodplain areas.

Potential sources of water quality degradation include pollutants from chemicals and nutrients from natural or man-made sources. Eroded sediments and other pollutants can be carried by stormwater to downstream receiving waters. Resulting water quality issues can impair the beneficial use of local waterways for recreation, wildlife habitat, and watering of livestock or other farm animals.

Water quality impacts are generally regulated by federal and state guidelines, usually through required water quality standards for receiving waters quality and limitations on the generation and release of urban pollutants.

Stormwater detention treatment facilities can be used to mitigate the effects of long-term and short-term hydrologic and water quality impacts changes. State and local regulations establish standards for detention stormwater treatment and other methods of stormwater control which can be applied as conditions of approval during local permitting proceedings. Mitigation for hydrologic and impacts are is usually accomplished by reducing or attenuating peak runoff rates, by either detaining (store and release), retaining (store but do not release) through stormwater detention , or infiltrating runoff from a developed site. Stormwater detention provides water quality benefits because storage promotes settlement of suspended sediments and other pollutants. Stormwater detention and water quality facilities are typically combined to use land more efficiently. “Dry” ponds, bioretention ponds, “wet” ponds, constructed treatment wetlands, retention ponds, biofiltration swales, biofiltration swales filter strips, underground vaults, bioslopes, and constructed wetlands dry wells are typically used stormwater treatment facilities. The Council finds that a range of measures are available and

site-specific mitigation for hydrologic and water quality impacts will be refined and selected during the Final Design and local permitting processes.

All of these facilities detain stormwater by releasing runoff through a regulating structure, such as an orifice or weir. Stormwater detention provides water quality benefits because storage promotes settlement of suspended sediments and other pollutants. Stormwater detention and water quality facilities are typically combined to use land more efficiently.

Source control Best Management Practices (BMPs) are intended to mitigate pollutants generated through normal operation and use of buildings, roadways, and other urban facilities. The Council finds that water quality degradation resulting from erosion and sedimentation and the release of pollutants can be minimized through the use of BMPs during construction. Construction BMPs include use of barrier berms, silt fencing, temporary sediment detention basins, plastic covering for exposed ground, vegetative buffers (hay bales), and restricting clearing activities to dry weather periods to contain sediment on-site. Further requirements could include diapering of all dump trucks to avoid spillage, and cleaning of heavy equipment tires and trucks before they are allowed to drive off-site. A variety of special BMPs can also be used at crossings or adjacent to streams or watercourses during construction.

In general, the Council finds that water quantity and water quality and hydrology impacts created by the construction and operation of the Columbia River Crossing Project can be substantially mitigated by complying with the following: DEQ water quality standards; Army Corps of Engineers Section 404 permit regulations; Department of State Lands regulations for instream activities; National Marine Fisheries Service (NMFS) conservation measures specified in the project Biological Opinion; Metro Title 3 regional standards; and City of Portland erosion control and stormwater regulations. These rules and regulations outline Best Management Practices to prevent or limit pollutants from entering surface waters through urban drainage systems. These types of measures could be imposed as conditions of approval during the NEPA process or, if reasonable and necessary, by local governments during the local permitting process.

Stormwater Runoff Impacts and Mitigation Options with the Expo Center/Hayden Island Segments

Within the Expo Center/Hayden Island Segments, specific water bodies include the Columbia Slough, the Columbia River and North Portland Harbor. As described in the Water Quality and Hydrology Report, the Columbia Slough is a slow-moving, low-gradient drainage channel running nearly 19 miles from Fairview Lake in the east to the Willamette River in the west. Water levels are managed with pumps, weirs, and levees. The levee system protects most of the floodplain in the vicinity of I-5 against flooding. Within the project area, the Columbia Slough is currently on Oregon's 303(d) list because it does not meet water quality standards for four parameters.

The I-5 crossing of the Columbia Slough is in a highly urbanized area. Riparian habitat along the slough has largely been replaced by buildings and paved surfaces compared to historic conditions. Riparian areas along the Slough are generally not adequate to provide shade, bank stabilization, sediment control, pollution control, or stream flow moderation. Within the

project area, I-5 is elevated on embankments or structures and, in general, the highway drainage systems do not handle runoff from outside the right-of-way.

I-5 crosses the Columbia River near river mile 106.5. North Portland Harbor, the portion of the Columbia River running south of Hayden Island, lies within the project area. Runoff from I-5 on Hayden Island drains directly into the Columbia River and North Portland Harbor. The east portion of Hayden Island is highly developed, with large hotels, a shopping center, residential communities, and other commercial activities. The western portion of the island is undeveloped and is comprised of pasture, woods, and wetland areas. Within the project area, the Columbia River is currently on Oregon's 303(d) list because it does not meet water quality standards for six parameters. DEQ does not differentiate between the North Portland Harbor and the Columbia River when compiling the 303(d) list.

Project data show four outfalls that drain to the Columbia River/North Portland Harbor within the project area. On Hayden Island, runoff from I-5 discharges directly to the Columbia River through road-side grates located along the entire span. Runoff from the bridge is not treated prior to release to the river.

As summarized in the Water Quality and Hydrology Report, the differences in long-term effects on water quality between the Columbia River Crossing Project and the No-Build Alternative are substantial. Although the Project would increase the total amount of pollutant generating impervious surfaces in the Columbia Slough Watershed and the Columbia River Watershed, the amount of untreated impervious surface would drop dramatically compared to existing conditions and the No-Build Alternative. This is because, with the Project, stormwater runoff from the entire Contributing Impervious Area (CIA) would be treated, while stormwater runoff from most of the existing impervious surfaces does not currently undergo stormwater treatment.

Based on the information contained in the Water Quality and Hydrology Report, the Council concludes that no adverse hydrologic or water quality impacts are expected in the Expo Center/Hayden Island Segment. The Project would increase overall impervious surfaces by about 28 acres, which could result in increased stormwater runoff rates and volumes and increase the amount of pollutants in stormwater. Without mitigation, this would affect the hydrology of project waterways. However, the Columbia Slough and the Columbia River are large water bodies and the project-related increase in stormwater volume would not result in a measurable increase of flows in these surface waters. Additionally, stormwater treatment design for the project corridor includes a number of stormwater treatment and/or infiltration facilities to reduce pollutants (including sediments and metals). Therefore, although the impervious surface area will increase by about 28 acres, untreated pollution generating surface area would be reduced from 219 acres to 0 acres.

The Council finds that, as described in the Water Quality and Hydrology Report, the Project will provide treatment not only for the new impervious area, but also for runoff from existing impervious surface area that does not currently receive treatment. The Council concludes that the project will provide treatment of approximately nine times the area of additional impervious surface being added as part of the Locally Preferred Alternative and will result in

overall positive effects to the water quality and hydrology of receiving waters. Stormwater runoff would be treated in compliance with current standards before being discharged to project area water features.

The Council recognizes that specific and detailed mitigation erosion control and water quality measures will be required for the construction of the LRT facilities and highway improvements in the Expo Center/Hayden Island Segment. The project team has prepared a draft stormwater management design in order to evaluate general feasibility and water quality effects associated with the project. For the portion of the Columbia River Crossing project in Oregon, the draft was prepared to meet the stormwater management requirements of ODOT and the City of Portland. The draft design includes gravity pipe drainage systems that would collect and convey runoff from the new bridges, transit guideway, and road improvements. Stormwater treatment facilities would reduce total suspended solids (TSS), particulates, and dissolved metals to the maximum feasible extent before runoff reaches surface waters.

The following stormwater treatment devices are included in the draft stormwater management design:

- Bioretention ponds – infiltration ponds that use an engineered (amended) soil mix to remove pollutants as runoff infiltrates through this material and into underlying soils.
- Constructed treatment wetlands – shallow, permanent, vegetated ponds that function like natural wetlands. They remove pollutants through such means as sedimentation, microbial activity, and uptake by plants.
- Soil-amended biofiltration swales – channels with mild slopes and shallow depths of flow. The channels are dry between storm events and they treat runoff by filtration as runoff flows through the vegetated surface and amended soils.
- Soil-amended filter strips – similar to grass swales, filter strips are intended to treat sheet runoff from an adjacent roadway surface.
- Bioslopes – like filter strips, are intended to treat sheet runoff from an adjacent roadway surface. The percolating runoff flows through a special mixture of materials, which promotes the absorption of pollutants.

Based on the draft stormwater management design, the Council finds that a range of measures are available to mitigate stormwater impacts and site-specific mitigation for stormwater quantity and quality impacts associated with the LRT and highway improvements, including the bridge construction across the North Portland Harbor and the Columbia River. These measures will be refined and selected during the FEIS and local permitting processes.

6.3.6 Criterion 8: Historic and Cultural Resources

> **"Identify adverse impacts on significant historic and cultural resources protected in acknowledged comprehensive plans. Where adverse impacts cannot practicably be avoided, identify local, state or federal review processes that are available to address and to reduce adverse impacts to the affected resources."**

Historic and cultural resource impacts specific to the Expo Center/Hayden Island Segment are addressed in the following section following a more general discussion of historic and cultural resource impacts and mitigation. Historic and cultural resource impacts and mitigation measures are also described in the Historic Built Environment Technical Report (Historic Report), and the Archaeology Technical Report (Archaeology Report).

General Overview of Historic and Cultural Resource Impacts

Section 106 of the National Historic Preservation Act of 1966, as amended, and Executive Order 11593 require that a federal agency consider the effect of a federally assisted project on any historic district, sites, buildings, structures, objects or any archaeological sites listed in or eligible for inclusion in the National Register of Historic Places.

Throughout earlier phases of the Columbia River Crossing Project, as with previously approved segments of the South/North Project, alternatives and options have been developed, evaluated, narrowed and refined. A significant objective in the narrowing and refinement of alternatives and options has been to avoid where practicable, or to minimize where avoidance is impracticable, potential impacts to historic and cultural resources

During preliminary and final engineering, further design work will be completed that would further attempt to avoid, minimize and/or mitigate adverse impacts to historic and cultural resources. Under federal procedures, the resulting impact analyses and commitment to feasible mitigation measures will be completed in coordination with the Oregon State Historic Preservation Officer (SHPO) and the Advisory Council for Historic Preservation (ACHP). A Memorandum of Agreement between FTA, FHWA, SHPO and ACHP and others will be executed to define how the project will mitigate adverse effects to historic and cultural resources.

Project staff, in consultation with Oregon's State Historic Preservation Officer, made a determination of the “area of potential effect” for that portion of the Columbia River Crossing Project within Oregon. The criteria of effect and criteria of adverse effect as set forth in the National Historic Preservation Act are highlighted below. The Council agrees with and adopts these criteria for purposes of measuring compliance with Criterion 8.

An undertaking has *an effect* on an historic property when the undertaking may alter characteristics of the property that may qualify the property for inclusion in the *National Register*. For the purpose of determining effect, alteration to features of the property’s location, setting, or use may be relevant depending on a property’s significant characteristics and should be considered.

An undertaking is considered to have an *adverse effect* when the effect on a historic property may diminish the integrity of the property’s location, design, setting, materials, workmanship, feeling or association. Adverse effects on historic properties include, but are not limited to:

- Physical destruction, damage, or alteration of all or part of the property;
- Isolation of the property from or alteration of the character of the property’s setting when that character contributes to the property’s qualification for the *National Register*;

- Introduction of visual, audible, or atmospheric elements that are out of character with the property or alter its setting;
- Neglect of a property resulting in its deterioration or destruction; and
- Transfer, lease or sale of the property.

The Historic Report includes an analysis of historic resources and historic districts within the Expo Center/Hayden Island Segments to determine the National Register of Historic Places status. It also assesses short and long-term impacts of the Project on historic, cultural and archeological resources. The Council accepts the methodology for determining "adverse effect" established in the Historic Report, and it adopts and incorporates by reference herein the facts and conclusions set forth in that document.

The City of Portland has completed an inventory of cultural resources and designated significant resource sites in its comprehensive plan. Some resources, which are inventoried in the local comprehensive plans under LCDC Goal 5, are not necessarily defined as "significant" through the NEPA process. Conversely, the federal environmental documents include discussion of some resources which are not inventoried or protected in Portland's plan. Criterion 8 only requires identification of adverse impacts on significant historic and cultural resources *protected* in acknowledged comprehensive plans.

General Discussion of Historic and Cultural Resource Mitigation Measures

The Historic Report outlines general measures to avoid, minimize or mitigate for long-term impacts and short-term construction impacts. It also includes a more specific discussion of mitigation measures for resources that may be adversely affected by the Columbia River Crossing Project. The Council finds the following to be examples of avoidance, minimization and mitigation options:

1. Demolition of resources could be minimized in some instances through refinement in the design of the project in a specific area.
2. Demolition could also be avoided through relocating the resource.
3. If these options are not feasible, recordation and salvage of the resource could mitigate for its loss.
4. Loss of access or isolation of resources could be minimized through design treatments such as creation of alternative access points, more visible signage, or traffic control to facilitate accessibility.
5. Noise and vibration impacts to resources could be minimized through design treatments and vibration suppression.
6. Visual impacts could be mitigated through enhanced design treatments. Station and shelter design, construction materials, and street improvements could be chosen to complement existing building and street settings. Stations could be moved to avoid placement in front of historic resources. Where possible, overhead wiring could be attached to existing support structures.
7. Areas with a high probability of archaeological resources have been identified. A professional archaeologist would be on site to monitor construction activities in these specified areas.

The Council finds that the discussion of general mitigation measures included within the Historic Report provides a good base for more detailed mitigation commitments in the FEIS.

Federal, State and Local Review Processes to Reduce Resource Impacts

Federal and State Processes

Section 106 of the National Historic Preservation Act of 1966, described above, defines the federal review process designed to ensure that historic properties are considered during federal project planning and execution. The process is administered by the ACHP and coordinated at the state level by the SHPO. An agency must afford the ACHP a reasonable opportunity to comment on the agency's project. Section 106 requires that every federal agency take into account how each of its undertakings could affect historic properties.

For the purposes of Section 106, any property listed in or eligible for listing in the National Register of Historic Places is considered historic. The process has five steps as follows: 1) identify and evaluate historic properties; 2) assess effects of the project on historic properties; 3) if an adverse effect would occur, then consultation with the SHPO and other interested parties would occur, and if necessary, a Memorandum of Agreement would be developed which defines what will be done to reduce, avoid or mitigate the adverse effects; 4) ACHP comment; and 5) proceed with the project, incorporating the mitigation in the Memorandum of Understanding.

At the state level, the historic preservation process is defined in ORS Chapter 358 and in the Land Conservation and Development Commission's Goal 5. The state process is implemented by the local jurisdictions through the adoption of historic preservation identification and protection plans in their individual comprehensive plans. The state process limits local preservation options. Under current law, local protection of historic properties requires owner consent. However, properties listed on the National Register may be preserved by local governments. Within the City of Portland, demolition must be reviewed and may be denied.

State law in ORS Chapter 358 and LCDC's Goal 5 rule, OAR 660-023-0200, encourage the preservation, management, and enhancement of structures of historic significance. It authorizes local governments to adopt or amend lists of significant historic resource sites. However, owners of inventoried historic resources must be notified and may refuse local historic resource designation at any time prior to adoption of the designation. No property may be included on the local list of significant historic resources where the owner objects. Moreover, a property owner may remove from the property a local historic property designation that was imposed by the local government.

OAR 660-023-0200(7) encourages local governments to adopt historic preservation regulations regarding the demolition, removal or major exterior alteration of all designated historic resources. It encourages consistency of such regulations with the standards and guidelines recommended in the Standards and Guidelines for Archaeology and Historic Preservation published by the US Secretary of the Interior. Further, OAR 660-023-0200(9) prohibits local governments from issuing permits for demolition or modification of an inventoried significant historic resource for at least 120 days from the date a property owner requests removal of historic resource designation from the property. It requires that local

governments protect properties that are listed on the National Register, including demolition review and design review.

Local Process

The City of Portland has a local process in place to address alteration or demolition of historic and cultural resources that are identified as significant and protected in local comprehensive plans. This process could be applied to address and to reduce adverse impacts to affected historic and cultural resources.

As described below, certain protected historic resources in the City of Portland would be adversely affected. City review processes to address and to reduce adverse impacts to such resources are provided in the City's Zoning Code at Chapter 33.445, Historic Resources Protection, and Chapter 33.846, Historic Reviews.

Under these chapters, two levels of historic resource designation are created: Historic Landmarks and Conservation Landmarks. The Historic Landmark designation offers the highest level of protection for resources of citywide significance. Resources in this designation have access to incentives for historic preservation, including transfer of development rights and the right to a more flexible range of uses (such as multi-family use in a single family zone; reuse of institutional and business buildings in residential zones for commercial or institutional purposes; and streamlined review procedures). However, owners doing projects that utilize incentives must consent to designation and agree not to demolish or modify the building without City approval.

Conservation Landmarks are available for resources whose significance is local rather than citywide. Although part of the city's inventory, these sites generally are not qualified to be Historic Landmarks.

The City has the option to deny demolition only for those resources designated as landmarks that have taken advantage of one or more of the preservation incentives offered by the code or are listed on the National Register. A condition for use of the incentives is the owners entering into a covenant with the city agreeing not to modify or demolish the resource without city approval. Also, demolition delays have been adjusted to meet the requirements of state law. The delay period is 90 days for Conservation Landmarks and 180 days for Historic Landmarks and resources in the Historic Resources Inventory. These delay periods start the day an application for demolition is received by the city.

Identified Significant and Protected Historic and Cultural Resources in the Expo Center/Hayden Island Segment

The Historic Report and the Portland Comprehensive Plan identify three significant and protected historic resources in the Expo Center/Hayden Island Segment.

- The northbound structure of the I-5 bridge (built in 1917); listed in the National Register of Historic Places (NRHP) in 1982.
- The carousel located at the Jantzen Beach Shopping Center; listed in the National Register of Historic Places.

- The Columbia Slough and Levee System as contributing elements of the Columbia Slough Drainage Districts Historic District. This resource was determined eligible by the State Historic Preservation Office in 2005.

Additionally, the 1960 Pier 99 commercial building has been determined to be NRHP-eligible for two reasons: (1) it is a good example of a Mid-Century Modern Commercial building designed and constructed in the "Googie" style; and (2) it was designed by Oregon architect John Storrs, whose innovative designs were an important contribution to the Northwest Regional style of architecture. However, the Pier 99 commercial building is not currently identified as a significant and protected resource in the Portland Comprehensive Plan.

The Archaeology Report states that no archaeological resources have previously been recorded within the Columbia River Crossing area of potential effect on the Oregon shore. The high degree of commercial development, along with a century of roadway construction and improvement within the area of potential effect, contributes to a low potential for historical archaeological features and deposits on the Oregon shore. Although the City of Portland Comprehensive Plan does not specifically identify and protect archeological resources, federal regulations, particularly Section 106 of the National Historic Preservation Act (NHPA), are applicable to such resources through the federal NEPA process.

Mitigation Options for Identified Historic and Cultural Resource Impacts in the Expo Center/Hayden Island Segment

Property acquisitions and physical changes are the primary source of long-term and direct effects to known and potential historic resources. Based on the findings in the Historic Report, the Council concludes that the Columbia River Crossing project will require the removal of the northbound bridge, which is included in the National Register of Historic Places and considered a significant resource in the Portland Comprehensive Plan. This northbound bridge structure has been a critical part of the transportation system and historic landscape for both Oregon and Washington since 1917.

The Council finds that a Memorandum of Agreement (MOA) to implement Section 106 of the National Historic Preservation Act will dictate the mitigation of effects to historic properties. Mitigation measures for the I-5 bridge are summarized below.

The Washington Department of Transportation (WSDOT) and ODOT would ensure that all efforts will be attempted to find an alternative use through a bridge marketing plan, including separating and relocating individual spans if relocation of the bridge in its entirety is not feasible. If it is not feasible to pursue moving and relocating the structure for adaptive reuse, documentation may be updated, including applicable photography and drawings. If appropriate, decorative or interpretive structural elements would be offered to local historical societies/museums or other interested parties. As the bridge is a critical component of the regional historic landscape, contributions would be made to interpretive programs and small projects which will result in documentation, waysides, exhibits, or other means of communicating the structure's history and meaning to the general public.

Based on the findings in the Historic Report, the Council concludes that the Columbia River Crossing project would have no adverse effects on the carousel located at the Jantzen Beach Shopping Center.

The project has an effect on the NRHP-eligible Columbia Slough Drainage Districts Historic District, but that effect is "not adverse." The Oregon Slough Levee is part of an extensive, historic system of engineered improvements to the area's drainage. A small portion of the levee, approximately 330 linear feet extending east of I-5, would need to be demolished and rebuilt in order to accommodate the ground improvements needed to stabilize soils below the I-5 ramps and bridges. There would also be modest modifications made to portions of two additional contributing properties: the North Denver Avenue Cross Levee and Union Avenue/Martin Luther King Fill/Cross Levee. Although localized alterations to contributing elements would occur, the integrity of each of the levees, as well as the overall system, would be maintained.

The Pier 99 Building would be displaced due to the construction of a ramp on I-5 between Marine Drive and Hayden Island. This would be an adverse effect. Although this building is not identified as significant or protected by the Portland Comprehensive Plan, it is identified as an NRHP-eligible structure. There is little likelihood that the structure can be relocated given the structural design and condition of the building. Documentation, including applicable photography and drawings, will be sought. If appropriate, decorative or interpretive building elements would be offered to local historical societies and museums.

Based on information in the Archaeology Report, the Council finds that long-term curation of any artifacts or samples recovered during archaeological investigations or during construction of the project will be determined in consultation with agencies, property owners, and appropriate tribes. Long-term curation of recovered materials is an essential element of archaeological investigations and is required as part of federal and state permitting processes.

6.4 Ruby Junction Maintenance Facility Findings and Mitigation Measures

As indicated in Section 2.3 of these findings, the Council authorized the modification and expansion of the previously approved Ruby Junction Maintenance Facility in 2008 to accommodate additional light rail vehicles associated with the Portland to Milwaukie Project. In its 2008 LUFO findings supporting that action, the Council noted: "The Ruby Junction expansion also is expected to serve additional light rail vehicles needed for future LRT expansion to Vancouver, Washington and potentially Oregon City."[12] Accordingly, the 2008 LUFO was approved with the expectation that the Ruby Junction Maintenance Facility would serve light rail vehicles associated with the Columbia River Crossing Project at some future time. With this 2011 LUFO, that expectation becomes a reality. As implied in the 2008 LUFO findings, the Council finds that such use can be fully accommodated within the location boundaries established in the 2008 LUFO.

Section 6.5 of the 2008 LUFO findings identified the impacts relevant to LCDC Criteria 3-8 that were expected to occur at the Ruby Junction Maintenance Facility as a consequence of expansion of that facility within the newly established location boundaries. Because all activity associated with the Columbia River Crossing Project will occur within the 2008 boundaries, the Council finds that additional impacts beyond those identified in the 2008 LUFO findings are not likely. The Council finds that increased light rail activity within the previously established boundaries will not result in any additional displacements or adverse economic, social or traffic impacts beyond those contemplated in 2008. For reasons stated in the 2008 findings, it also finds that use of the facility by light rail vehicles serving the Columbia River Crossing Segments will not increase noise in the vicinity of the facility or alter its findings with respect to natural hazards, natural resources, stormwater runoff or historic or cultural resources. The Council continues to adhere to those 2008 findings and it incorporates them herein by this reference.

[12] 2008 LUFO Findings of Fact and Conclusions of Law at page 91.

7.0 Compliance with Substantive Criteria (3-8) Short Term (Construction) Impacts

7.1 Introduction

This section summarizes the short-term impacts associated with construction of the light rail and highway improvements in the Expo Center/Hayden Island Segment. The primary objectives of including short-term, construction impacts in the LUFO findings are to:

- Identify the location, importance and duration of potential, major construction impacts; and
- Identify potential mitigation measures (in general terms) for major impacts.

Linear projects such as light rail transit are typically divided into various segments or line sections for construction of the trackway, structures, stations and related work. In sections where the track is located within a separate right-of-way, extensive clearing and grading may be required. During the grading phase, culverts and other permanent drainage structures will be installed. Underground utility services may be relocated during the grading phase to avoid interference with light rail construction.

Following the grading and preliminary site work, installation of light rail utility duct banks, catenary pole foundations, platform foundations, and major structures such as bridges will begin. Bridge work will be accompanied by foundation construction which may involve pile driving or other specialized operations. Other activity outside the trackway also may occur during this period, such as construction or relocation of roadways and construction of traction power substations and signal buildings.

The next construction phase involves the installation of track work, catenary poles, catenary wire, signals, communications cables and other system-wide elements. Once all elements of the LRT system are complete, integrated testing and start-up will begin.

For both the light rail transit and highway improvements, construction of the bridges over the Columbia River will be the most substantial element of the Project, and this element sets the sequencing for the other Project components. The main river crossing and immediately adjacent highway improvement elements would account for the majority of the construction activity necessary to complete the Project. Construction of the I-5 Columbia River bridges is expected to last approximately four years. The general sequencing of constructing the bridges would likely entail the following steps:

- Initial preparation – mobilize construction materials, heavy equipment and crews; prepare staging areas; install temporary piles to support work and anchor barge platforms
- Installation of drilled shafts – install drilled shafts to support the bridge pier columns
- Shaft caps – construct and anchor concrete foundations on top of the drilled shafts to support column piers

- Pier columns – construct or install pier columns on the shaft caps
- Bridge superstructure – build or install the horizontal structure of the bridge spans across the piers; the superstructure would be steel or reinforced concrete; concrete could be cast-in-place or precast off-site and assembled on-site.

Interchanges on each end of the bridge would first be partially constructed so that all I-5 traffic could be temporarily rerouted onto the new southbound (western) Columbia River bridge. Constructing the southbound approaches for the Hayden Island interchange (and SR 14 interchange in Washington) would require approximately 3 years. Certain portions of the Hayden Island interchange (and SR 14 interchange) must be completed before traffic can be moved onto the new southbound lanes and construction of the remaining northbound lanes and interchange ramps can proceed. Once I-5 traffic in both directions is rerouted to the new western I-5 bridge, the new northbound segments of the Hayden Island interchange (and SR 14 interchange) would be constructed.

The Marine Drive interchange construction would need to be coordinated with construction of the southbound lanes coming from Vancouver. While this interchange can be constructed independently from the work described above, the completion and utilization of the ramp system between Hayden Island and Marine Drive requires the work to occur in the same period.

Constructing the project would entail many different activities, some of which would disrupt traffic. Typical construction methods would require shifting I-5 traffic onto temporary alignments, narrowing lanes and shoulders to accommodate equipment and workers, shortening merge and exit distances, reducing posted speed limits, and closing or detouring some traffic movements. For I-5, it is anticipated that three southbound and three northbound lanes would be maintained during all weekdays, except when the final changeover occurs between the old bridges and the new bridges. Local streets and driveway accesses may be closed temporarily and traffic detoured. All parcels impacted by temporary access closures or detours will have alternate access routes.

The following summarizes the types of activities anticipated to construct the CRC project:

- Over-water bridge construction. This work would include the steps outlined above.
- Over-water bridge demolition of the existing I-5 bridges. The components of the existing I-5 bridges would be dismantled and removed. The main components include the bridge decks, the counterweights for the lift span, towers, decks trusses, piers and piles.
- Highway and over-land bridge construction. The reconstruction of mainline I-5 and associated interchanges and local roads would involve a sequence of activities that would be repeated several times, including on-land bridge and retaining wall construction, the excavation of embankments, and laying the pavement driving surface.

Construction would require staging areas to store construction material, to load and unload trucks, and for other construction support activities. The existing I-5 right-of-way would

likely accommodate most of the common construction staging requirements. However, some construction staging would likely be needed outside the existing right-of-way, and temporary property easements from adjacent or nearby property owners may be required.

7.2 Short Term Construction Impacts and Mitigation Measures

7.2.1 Criterion 3: Neighborhood Impacts

> **"Identify adverse economic, social and traffic impacts on affected residential, commercial and industrial neighborhoods and mixed use centers. Identify measures to reduce those impacts which could be imposed as conditions of approval during the National Environmental Policy Act (NEPA) process or, if reasonable and necessary, by affected local governments during the local permitting process."**
>
> **"A. Provide for a light rail route and light rail stations, park-and-ride lots and vehicle maintenance facilities, including their locations, balancing (1) the need for light rail proximity and service to present or planned residential, employment and recreational areas that are capable of enhancing transit ridership; (2) the likely contribution of light rail proximity and service to the development of an efficient and compact urban form; and (3) the need to protect affected neighborhoods from the identified adverse impacts."**
>
> **"B. Provide for associated highway improvements, including their locations, balancing (1) the need to improve the highway system with (2) the need to protect affected neighborhoods from the identified adverse impacts."**

The Columbia River Crossing Project will result in adverse short-term economic, social and traffic impacts through disruptions to existing land uses. However, these impacts will be temporary in duration and should end when the construction activities are completed. Construction of light rail facilities and highway improvements will adversely impact local economic and social interests located adjacent to or nearby construction or staging areas by interfering with residences and businesses, disrupting traffic and pedestrian movement, displacing parking, altering accesses, and causing noise, vibrations, dust, congestion, increased truck traffic near residences and businesses, and visual impacts. Rerouting, detours and lane closures will create temporary additional traffic through neighborhoods, with associated noise, dust and congestion. Construction machinery, trucks, and general construction activities will be temporary negative visual features of the project. Businesses that would be likely to feel the greatest impact are those that would experience the longest construction periods, those that have many other convenient competitors and those that are most dependent upon convenient access.

Economic and Social Impacts

Throughout the Expo Center/Hayden Island Segment, construction will have short-term and temporary impacts to businesses and neighborhoods of the nature described above. During the FIES and preliminary engineering phase, specific mitigation plans will be developed to address short-term economic and social impacts to businesses and residences. These measures will include maintaining access to existing uses and providing screening to minimize dust and visual impacts. Wherever possible, the project will provide alternative access and ensure that access is maintained to all properties during construction. Businesses that require access at all times and generate many trips (e.g., delivery services, drive-ins) may be inconvenienced. Utility services also may be interrupted as a result of construction. In the event that access or utility service to a residence or businesses would be temporarily disrupted, advance notice would be provided and the length of the disruption would be minimized to the extent practical.

Temporary construction impacts on neighborhoods could result from increased traffic congestion, truck traffic, noise, vibration and dust. Temporary street closures, traffic reroutes and detours could increase traffic within neighborhoods and impede access to community facilities. These short-term impacts include partial closures of streets, temporary rerouting or relocation of driveways, noise impacts from pile driving and bridge pier construction, and impaired access for elderly and mobility-impaired residents.

For neighborhoods affected by construction, the Council finds that TriMet and ODOT can work with neighborhood representatives to identify issues of concern and potential mitigation measures. Potential mitigation measures for short-term impacts include:

- Developing construction management plans for incorporation into contracts following close coordination with neighborhood and business associations and with representatives of public facilities/utilities located adjacent to the alignment/corridor
- Providing on-going coordination during construction to keep affected neighborhood and business area representatives informed about the schedule and location of construction work and anticipated modifications to access
- Limiting construction hours for certain activities in sensitive areas
- Providing fencing around construction and staging areas

Construction activities also could reduce accessibility to police, fire departments and other public safety and emergency service providers. Construction activities will, at times, impede the movement of emergency vehicles by temporarily narrowing or reducing the number of travel lanes or by detouring traffic and road segment closures. To ensure the most effective, continuous access to construction site vicinity uses for public safety and emergency service providers, the Council finds that the following measures could be employed:

- Develop construction management plans, for incorporation into construction contracts, in close coordination with affected police and fire departments and other emergency service providers
- Involve emergency service providers in planning for traffic management during construction in order to identify alternate emergency routes in advance of construction

- Maintain regular coordination with emergency service providers during construction to give them advance notice of when, where and for how long traffic capacity constraints on streets will be employed, and to plan for how local emergency access will be maintained

In summary, the Council finds that numerous measures are potentially available to mitigate impacts to businesses and neighborhoods. Potential mitigation measures beyond those listed above include:

- Management of construction activities to reduce dust, noise and vibration
- Fencing and buffering to reduce construction impacts in sensitive areas
- Use of berms, hay bales, plastic sheeting and other similar measures to reduce surface erosion and runoff into water bodies and storm sewers
- Provision of temporary alternative parking and pedestrian access

Traffic Impacts

Construction of the LRT and highway improvements in the Expo Center/Hayden Island Segment would result in temporary impacts to local and regional traffic operations. These impacts would include increased congestion on several major traffic facilities in the corridor including I-5 and, potentially I-205, impacts resulting from traffic relocations or detours, full or partial street closures, and increased truck traffic associated with construction activity. Impacts could also result from the intrusion of non-local traffic into residential areas as a result of temporary street closures and traffic detours, disruptions to vehicular and pedestrian access to businesses and community services, and the temporary loss of on- or off-street parking.

A major element of the Project would be construction of new bridges over North Portland Harbor and the Columbia River to accommodate vehicular, light rail, and non-motorized traffic coupled with a partial or complete reconstruction of I-5 from south of the Victory Boulevard interchange to the new bridges. Complete reconstruction of freeway interchanges at N Marine Drive and Hayden Island would be included. Another major element of the Project would be construction of the light rail station on Hayden Island. High levels of tuck traffic are anticipated in connection with earthwork and the delivery of materials at the bridge crossings, freeway mainline segments, and interchanges. Several construction staging areas would be needed.

Construction in the vicinity of Marine Drive is expected to include partial closure of this street and/or development of detour routing to accommodate vehicular traffic, particularly trucks moving between the freeway and the Columbia Corridor and Rivergate industrial areas. Temporary access may need to be provided to Delta Park and the residential/business areas on the east side of the freeway and to the Expo Center on the west side. Existing transit, bicycle, and pedestrian connections must also be maintained, including access to the Expo Center light rail station and the 40-mile loop trail.

Construction activities on Hayden Island include reconstruction of the existing I-5 interchange, including the development of a collector-distributor system of auxiliary freeway lanes, modifications to local traffic circulation, and a new light rail station and trackage. Temporary access routes to and from I-5 would need to be maintained to ensure continual multimodal access to the island for residents and businesses, as well as connections on the island between areas to the east and west of the freeway. A high level of truck activity associated with the freeway, bridge, ramp and construction of local facilities is anticipated on Hayden Island.

Transit impacts during construction could include service delays, relocation or temporary elimination of bus stops, street detours, and deterioration in reliability for bus routes using certain roadways and facilities within the corridor. Short-term construction would impact bus operations along I-5 and on Hayden Island.

Mitigation Strategies for Construction Impacts to Traffic, Transit and Bike and Pedestrian Mobility

As highlighted above, short-term construction impacts will likely take the form of roadway closures, detours and/or lane reductions, increased truck traffic, pedestrian access restrictions and local access restrictions. Mitigation measures for construction impacts to traffic and highways could include a variety of activities, ranging from scheduling construction activities to minimize conflicts during peak travel periods to using alternative construction techniques or equipment. The Council finds that measures to mitigate the short-term traffic impacts in the Expo Center/Hayden Island Segment could include, but are not limited to, the following:

- Work with appropriate jurisdictions to obtain approval of traffic control plans.
- Develop and implement a transportation management plan with affected businesses and community interests. This plan would address a variety of traffic, transit, and alternative mode strategies to minimize the transportation impacts of project construction. The plan would also identify detour routes where necessary to maintain traffic movement. This would be particularly important during construction of the Marine Drive interchange that serves the Port of Portland.
- Wherever possible or practical, limit or concentrate work areas to minimize disruptions to vehicular traffic and bus and pedestrian circulation, as well as to business access.
- Identify, provide and/or advertise temporary parking locations to replace parking temporarily displaced by construction.
- As appropriate, develop and implement functional and reasonable alternative construction techniques to minimize traffic impacts. These techniques might include activities such as limiting construction to non-daylight hours in certain locations. Use of two or three shifts per day to reduce construction time could be implemented in critical traffic areas, subject to development of adequate traffic control plans, noise control measures, and budget and schedule allowances.

The Council also finds that TriMet has years of experience helping communities and small businesses overcome the challenges of transit construction activities. Light rail guideway

construction may require rerouting the buses on Hayden Island. Minor rerouting of buses would be necessary as new ramps and access points are opened at the Hayden Island interchange.

TriMet and other organizations would conduct a large communications campaign to inform the public about transit changes. The temporary routing, potential for more crowded buses and slower travel times would be communicated through TV, radio, web site, newspaper and other multimedia instruments to broadcast rider alerts to potential impacted customers.

Keeping businesses open and accessible during light rail construction in the Expo Center/Hayden Island Segment would be a top priority. During previous light rail transit construction projects, TriMet has kept construction disruption to a minimum while maintaining access to businesses, and has rapidly responded to concerns and potential issues.

Measures to minimize construction impacts to bicycle and pedestrian mobility through the project areas will also be implemented during construction. Such measures would include:

- Coordination with local jurisdictions and bicycle and pedestrian advocacy groups to disseminate information about construction activities and associated temporary closures and detours near construction zones.
- Temporary enclosures to maximize the safety of bicyclists and pedestrians traveling beneath structures under construction.
- Additional signage and/or lighting along popular bicycle and pedestrian routes that may experience an increase in vehicle traffic due to traffic detours.
- Traffic calming measures in work zones to improve safety for bicyclists, or alternate routes on parallel streets where convenient and effective.

The Council finds that while tolling of I-5 during construction is permissible under federal statutes, no recommendations or decisions about tolling during construction have yet been made. Tolling during construction could serve as a demand reduction measure to reduce traffic during the construction phase. The Council finds that decisions on this issue will be made by the Oregon and Washington Transportation Commissions following consultation with the Project's local partners and a public outreach and education process.

Criterion 4: Noise Impacts

> **"Identify adverse noise impacts and identify measures to reduce noise impacts which could be imposed as conditions of approval during the NEPA process or, if reasonable and necessary, by affected local governments during the permitting process."**

As with any large project, construction of light rail and highway improvements and bridges involves the use of heavy equipment and machinery that result in intense noise levels and occasionally high vibration levels in and around the construction site. Sections of the LRT alignment and highway improvements in the Expo Center/Hayden Island Segment are adjacent to noise sensitive uses such as houseboats and hotel rooms.

As described in the Noise Report, four general construction phases would be required to complete the project: 1) land preparation, 2) constructing new structures, 3) miscellaneous construction activities, and 4) demolition activities.

Major noise-producing equipment used during the preparation stage could include concrete pumps, cranes, excavators, haul trucks, loaders, tractor trailers and vibratory equipment. Maximum noise levels could reach 82 to 86 dBA at the nearest residences (50 to 100 feet) for normal construction activities during this preparation phase. Major noise and vibration-producing activities would occur primarily during demolition and preparation for the new bridges. Activities that have the potential to produce a high level of vibration include pile driving, vibratory shoring, soil compacting, and some hauling and demolition activities.

The loudest noise sources during the phase of constructing new structures would include pile drivers, cement mixers, concrete pumps, pavers, haul trucks, and tractor trailers. Maximum noise levels would range from 82 to 94 dBA at the closest receiver locations.

Following the heavy construction, miscellaneous construction activities such as installation of bridge railings, signage, lighting, roadway striping, and others would occur. These less intensive activities are not expected to produce noise levels above 80 dBA at 50 feet except on rare occasions, and then only for short periods.

Demolition of existing structures would require heavy equipment such as concrete saws**,** cranes**,** excavators, hoe rams, haul trucks, jackhammers, loaders, and tractor trailers. Maximum noise levels could reach 82 to 92 dBA at the nearest residences. Demolition would occur at various locations and times during the construction process.

The Council finds that adverse noise impacts associated with construction are temporary and can be effectively mitigated by avoiding construction on Sundays, legal holidays, and during the late evening and early morning hours in noise sensitive areas. Additionally, the Council finds that equipping motorized construction equipment with sound control devices, and developing construction contract documents that include noise limit specifications, reinforced with state/local ordinances and regulations, can be effective techniques for minimizing adverse noise impacts associated with construction.

If specific noise complaints are received during construction, the contractor could be required to implement one or more of the following noise mitigation measures:

- Locate stationary construction equipment as far from nearby noise-sensitive properties as possible.
- Install temporary or portable acoustic barriers around stationary construction noise sources.
- Shut off idling equipment.
- Reschedule construction operations to avoid periods of noise annoyance identified in the complaint.
- Notify nearby residents whenever extremely noisy work will be occurring.

- Operate electrically powered equipment using line voltage power rather than generators.

Criterion 5: Natural Hazards

> **"Identify affected landslide areas, areas of severe erosion potential, areas subject to earthquake damage and lands within the 100-year floodplain. Demonstrate that adverse impacts to persons or property can be reduced or mitigated through design or construction techniques which could be imposed during the NEPA process or, if reasonable and necessary, by local governments during the permitting process."**

Although no *landslide areas* or *areas of severe erosion potential* have been identified in the Expo Center/Hayden Island Segment, construction activities at stream crossings and near water bodies could result in erosion and have detrimental effect on water quality. To avoid and minimize such impacts, the project will prepare and implement stormwater pollution prevention plans and grading plans, hydroseed, manage stockpiled fill, and employ other best management practices (BMPs) for erosion control." Construction activities will specifically comply with:

- WSDOT Standard Specifications for Road, Bridge and Municipal Construction M 41-10
- ODOT Erosion Control Manual
- City of Vancouver VMC Chapter 14.24, Erosion Control
- City of Portland Erosion and Sediment Control Manual

Inspection and observation monitoring and reporting would be conducted throughout the project to ensure the appropriate erosion-control measures are being conducted.

The Council finds that construction-related impacts associated with landslides, earthquakes, and the 100-year floodplain are not anticipated, and potential construction-related impacts associated with erosion can be effectively mitigated for through the measures discussed above.

Criterion 6: Natural Resource Impacts

> **"Identify adverse impacts on significant fish and wildlife, scenic and open space, riparian, wetland and park and recreational areas, including the Willamette River Greenway, that are protected in acknowledged local comprehensive plans. Where adverse impacts cannot practicably be avoided, encourage the conservation of natural resources by demonstrating that there are measures to reduce or mitigate impacts which could be imposed as conditions of approval during the NEPA process or, if reasonable and necessary, by local governments during the permitting process."**

Natural resource impacts specific to the Expo Center/Hayden Island Segment are addressed in the following section.

Fish and Wildlife Habitat. Short-term impacts to fisheries include the impact pile driving of temporary piles and use of barges. The installation of up to 1,500 temporary steel piles will result in behavioral disturbance and injury or death to ESA-listed and other native fish species. The project will use hydroacoustic attenuation measures, such as bubble curtains, to reduce initial sound levels from impact pile driving, resulting in less severe impacts to fish in the project area. Through timing impact pile driving activities and use of attenuation measures, impacts to ESA-listed fish are minimized to the extent practicable. Due to the extent of in-water work and the presence of many ESA-listed fish, it is acknowledged that adverse effects to individual fish and their critical habitat are likely to occur, but the continued existence of any species will not be jeopardized. Adverse effects are avoided or minimized to the extent practicable. The Council notes that NMFS produced this finding in their Biological Opinion. In addition to this mitigation, the Council finds that the mitigation measures outlined above in Section 6.3.4 of these findings for Threatened, Endangered, and Candidate Fish are available to mitigate adverse impacts to the Expo Center/North Portland Harbor and the Columbia River and could be imposed as conditions of approval during the FEIS process and/or the local permitting process if reasonable and necessary.

The Project would temporarily impact terrestrial resources, such as migratory birds and species of interest, through noise impacts and removal or degradation of habitat. Mitigation measures to address these impacts include impact avoidance and impact minimization. Impact avoidance would be addressed by timing vegetation removal to occur outside of nesting seasons for migratory birds. Demolition of existing structures, if necessary, would likely be scheduled outside of nesting seasons for native migratory birds, to avoid direct impacts to active nests.

Impact minimization would be addressed by implementing best management practices such as erosion and sediment control to protect riparian buffers and sensitive terrestrial habitats (for example, for riparian species such as pond turtles). Swallows may nest on the concrete piers but are assumed not to be nesting on steel portions of the existing I-5 bridges. The I-5 bridges could be inspected at least one full year prior to commencement of construction activities to determine whether any species of interest or migratory birds are using the bridges for nesting or roosting. If such species are present, exclusionary devices may be installed on the bridges during the non-nesting season to prevent them from being used for nesting or roosting during construction activities. If high-disturbance activities must take place during the nesting season, the Columbia River Crossing project team would coordinate with USFWS, Oregon Department of Fish and Wildlife (ODFW), and WDFW to establish work buffer zones around the nest(s) during nesting season.

Scenic and Open Space Areas. During construction the visual quality of views to and from the project area would be temporarily altered. Construction-related signage and heavy equipment would be visible in the vicinity of construction sites. Vegetation may be removed from some areas to accommodate construction of the bridges, new ramps, and the light rail transit guideway. This would degrade or partially obstruct views or vistas.

Nighttime construction would be necessary to minimize disruption to daytime traffic. Temporary lighting may be necessary for nighttime construction of certain project elements. This temporary lighting would affect residential areas by exposing residents to glare from unshielded light sources or by increasing ambient nighttime light levels.

Mitigation for temporary construction-related effects would include:

- Shielding of construction site lighting to reduce spillover of light onto nearby residences and businesses,
- Locating construction equipment and stockpiling materials in less visually sensitive areas, when feasible and in areas not visible from the road or to residents and businesses in order to minimize visual obtrusiveness, and
- Cover exposed soils as soon as possible with vegetation.

Riparian Areas. To address temporary loss of riparian vegetation resulting from project impacts, mitigation measures could include streambank revegetation and reshaping to restore habitat function, removal of noxious weeds in certain areas, and revegetation of disturbed areas with native species.

Wetland Areas. Construction will occur near several identified wetland areas in the Expo Center/Hayden Island Segment. Temporary disturbances to wetland-related wildlife activity, hydrology, and water quality will be avoided as much as possible through the use of Best Management Practices (BMPs) such as silt fences, construction fencing, and wildlife exclusionary netting during the construction process.

Park and Recreational Areas. Temporary effects to park and recreation resources include the temporary use of parkland to stage construction and store materials; increased noise, glare, dust, and vibration; and temporary closures, detours, and congestion that could delay users traveling to parks or recreational activities. Mitigation activities to address these impacts include:

- Restoring landscaping to original condition following construction and protect remaining trees close to construction areas.
- Providing adequate signage for any limited or closed access points and detour routes.
- Adopting a joint public information campaign with parks' jurisdictions for some of the longer closures.
- Maintaining safety for bicyclists and pedestrians traveling on trails and between facilities with temporary enclosures, additional signage and lighting, etc.

Criterion 7: Stormwater Runoff

> **"Identify adverse impacts associated with stormwater runoff. Demonstrate that there are measures to provide adequate stormwater drainage retention or removal and protect water quality which could be imposed as conditions of approval during the NEPA process or, if**

reasonable and necessary, by local governments during the permitting process."

Stormwater runoff impacts specific to the Expo Center/Hayden Island Segment are addressed in the following section.

The in-water construction of bridge piers could stir up sediments from the riverbed, which would increase turbidity. In-water work includes the use of barges and work bridges in the Columbia River and North Portland Harbor, equipment that would be temporarily anchored to the riverbed. Temporary cofferdams would also be installed, but would not be dewatered, for the piers nearest the shoreline, where the water is shallow. Turbidity caused by any activity inside the cofferdams (including installation of permanent shafts as well as temporary piles) would be contained within the cofferdams. Sediment would be disturbed during the installation and removal of the cofferdams. During the demolition of the existing structures, riverbed sediment would be disturbed when the timber piles of the I-5 bridges are cut off below the mudline.

There are no known records of contaminated sediments in the Columbia River portion of the project area. Therefore, there is very little risk that in-water work in the Columbia River would re-suspend contaminated sediments. Contaminated sediments have been identified in the North Portland Harbor, but they are likely outside of the project footprint. If there is potential that in-water work could disturb these sediments, they would be analyzed in accordance with regulatory criteria, and if necessary, removed from the river and disposed of properly. Removed sediments may be disposed of in a permitted upland disposal site, if required.

Potential sources of toxic contaminants associated with in-water work include refueling track-mounted equipment located on the barges or work bridges, lead-based paint from the existing bridges, turbidity and concrete debris from wire-saw-cut concrete during demolition, green concrete (concrete that has not fully cured) associated with bridge construction, potential spills from construction equipment, and materials accidentally entering the Columbia River and North Portland Harbor during over-water work. Full containment of fuel, other hazardous materials, and green concrete would be required to prevent these materials from entering the Columbia River and North Portland Harbor, in accordance with project specifications.

On land, construction activities occurring below-grade may require the removal of groundwater through pumping, a process known as dewatering. Therefore, constructing roads, transit lines, and other infrastructure below the surrounding surface can alter groundwater conditions. If there are nearby hazardous materials sites, dewatering can increase the likelihood of contaminants migrating through the groundwater and into surface waters. The following elements of the Project within the Expo Center/Hayden Island Segments are relatively close to high ranking potential hazardous materials sites and near-surface groundwaters, and work at these sites would require below-grade construction techniques:

- Marine Drive Interchange
- North Portland Harbor Bridges

- Hayden Island Interchange
- Columbia River Crossing

Left unmitigated, construction of these elements could result in moderate risks for the migration of existing contamination, potentially affecting both ground and surface water quality. In addition to existing contamination, the installation of shafts and piles below ground includes the risk of introducing new contamination, for example from green concrete, into groundwater. Further discussion of contamination issues associated with below-grade construction is included in the Hazardous Materials Technical Report.

Without proper management, land-based construction activities may have temporary adverse effects on water quality in nearby water bodies. Construction involves ground disturbances that can increase soil erosion substantially, especially for construction activities along river or stream banks. The Project would involve ground disturbance near North Portland Harbor and the Columbia River within the Expo Center/Hayden Island Segments. If runoff contains extra sediment from erosion, waterways can become turbid (cloudy) and can build up excessive sediment deposits. Runoff and soil erosion can also transport pre-existing hazardous materials and construction-related hazardous materials into water bodies, some of which may dissolve in water or are water-transportable. These materials can be harmful to aquatic life.

The construction of the Columbia River Crossing Project would require at least one large site to stage equipment and materials, and may also need a large site for use as a casting yard for fabricating segments of the new bridges. Each site being considered, including one in Oregon, is adjacent to the Columbia River. The existing conditions on these sites range from a developed and paved port terminal to a currently undeveloped site. Staging and casting/assembly site activities may increase stormwater runoff over existing conditions and may increase pollutant levels in the runoff. However, any staging and/or casting site would be required to meet all applicable stormwater requirements, including the implementation of erosion and sediment controls. All necessary permits would be secured prior to site development and operations for any major staging or casting yard.

The Council finds that water quality degradation resulting from erosion and sedimentation and the release of pollutants can be minimized through the use of BMPs during construction. Construction BMPs include use of barrier berms, silt fencing, temporary sediment detention basins, plastic covering for exposed ground, vegetative buffers (hay bales), and restricting clearing activities to dry weather periods to contain sediment on-site. Further requirements could include diapering of all dump trucks to avoid spillage, and cleaning of heavy equipment tires and trucks before they are allowed to drive off-site. A variety of special BMPs can also be used at crossings or adjacent to streams or watercourses during construction.

Criterion 8: Historic and Cultural Resources

> **"Identify adverse impacts on significant historic and cultural resources protected in acknowledged comprehensive plans. Where adverse impacts cannot practicably be avoided, identify local, state or federal review**

processes that are available to address and to reduce adverse impacts to the affected resources."

Historic and cultural resource impacts specific to the Expo Center/Hayden Island Segment are addressed in the following section.

As discussed above in Section 6.3.6 of these Findings, three significant and protected historic resources exist in the Expo Center/Hayden Island Segment:

- The northbound structure of the I-5 bridge (built in 1917); listed in the National Register of Historic Places (NRHP) in 1982.
- The carousel located at the Jantzen Beach Shopping Center; listed in the National Register of Historic Places.
- The Columbia Slough and Levee System as contributing elements of the Columbia Slough Drainage Districts Historic District.

The impacts to the northbound structure of the I-5 bridge and to the Columbia Slough and Levee System would be permanent, as opposed to temporary. The carousel is located with the Jantzen Beach Shopping Center and would not experience any temporary effects.

Mitigation for any cultural resources impacted during construction is as described in Section 6.3.6 of these LUFO findings.